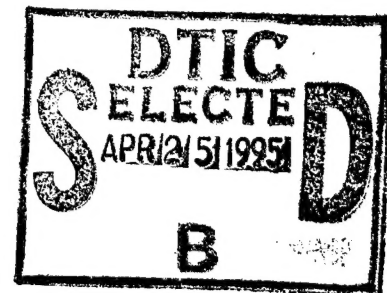# System Specification (Type A) for the Joint Tactical Information Distribution System (JTIDS) Test Device (JTD)

By

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April 1995

Prepared for

Deputy Director
JTIDS Joint Program Office
Electronic Systems Center
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Hanscom Air Force Base, Massachusetts

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REVIEW AND APPROVAL

This technical report has been reviewed and is approved for publication.

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13. ABSTRACT *(Maximum 200 words)*

The original version of this specification was prepared for inclusion in the Request for Proposal (RFP) to contractors for the acquisition of the Joint Tactical Information Distribution System (JTIDS) Test Device (JTD). It set forth the minimum set of requirements for the JTD and also contained a large number of "design goals" which were capabilities desired by the government and to be proposed at the contractor's option. This Revision 1 incorporates, as full requirements, those "design goals" which have been placed on contract by the JTIDS Program Office.

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EXECUTIVE SUMMARY

This Revision 1 updates MITRE Technical Report (MTR) 94B0000050 which specified the requirements for the Joint Tactical Information Distribution System (JTIDS) Test Device (JTD) for use in the Request for Proposal (RFP) package to contractors for the acquisition of the JTD. It incorporates, as full requirements, those capabilities which were included in the original specification as "design goals" and have subsequently been contracted for by the JTIDS Program Office.

This specification establishes the system level performance, design, development, test and maintenance requirements for the Joint Tactical Information Distribution System (JTIDS) Test Device (JTD). These requirements were derived from a thorough investigation of the JTIDS user community's test tool needs. The JTD contract was recently awarded by the JTIDS JPO to Dynamic Research Corporation. The requirements contained in this document represent the negotiated requirements to be met by the JTD contractor.

Many of the requirements derive from the desire by intended customers to retain functional attributes existing within currently fielded Tactical Digital Information Link (TADIL) test tools. Other requirements follow from the perceived shortcomings of these existing test tools. Totally new requirements that will simplify the tasks associated with JTIDS integration and training efforts, or are new interfaces which must be supported within the TADIL testing community, were also added.

The need for the JTD resulted from the expiration of all test tool acquisition contracts within the JTIDS Joint Program Office. The JTD is intended to support contractor software development and the integration of host platforms with various TADIL equipment, and to support field testing, intra-service/inter-service/international TADIL certification, platform interoperability testing, and TADIL training.

The JTD is intended to be a nondevelopment item (NDI) as much as is possible. The JTD is a hardware and software system that provides the capability to interface with military host systems on TADILs A, B, C, and J for the purpose of supporting host system message processing software development and contractor qualification testing of that software. It is intended to be used in a laboratory environment.

The JTD has two basic sets of functional capabilities. The first set of functions is associated with "the operational state." In this state, the JTD provides a test facility with the capabilities of operating on the TADIL, emulating a JTIDS terminal to a tactical host data system, monitoring and recording TADIL message traffic, and simulating TADIL link traffic to the host under test at up to peak-load conditions for capacity testing. It provides the operator with pre-test, test execution, and post test analysis functional capabilities.

The second state, called "the maintenance state," provides the operator with a means to perform self test of the JTD hardware. The JTD also provides the operator with a means to initiate BIT within the JTIDS terminal or initiate testing functions for TADILs A, B, C and to review the results of these testing functions.

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SECTION 1

SCOPE

1.1 IDENTIFICATION

This specification establishes the system level performance, design, development, test and maintenance requirements for the Joint Tactical Information Distribution System (JTIDS) Test Device, hereafter referred to as the JTD.

1.2 SYSTEM OVERVIEW

The JTD is a hardware and software system that provides the capability to interface with military host systems on a variety of Tactical Digital Information Links (TADILs) for the purpose of supporting host system message processing software development and contractor qualification testing of that software in a realistic yet cost-effective manner. It also supports integration of host platforms with the TADIL equipment. It is also intended to support field, intra-service, and inter-service/international TADIL certification and platform interoperability testing. The JTD provides a test facility with the capabilities of operating on the TADIL, emulating a JTIDS terminal to a tactical host data system, monitoring and recording TADIL message traffic, and simulating TADIL link traffic to the host under test at up to peak-load conditions for capacity testing. The JTD's intended use is in a laboratory environment.

1.3 DOCUMENT OVERVIEW

Section 2 presents the Government and non-Government documents applicable to the JTD and referenced within the specification. Section 3 details the system requirements for the JTD. Section 4 details the quality assurance requirements for the JTD. Section 5 outlines preparation requirement for the delivery of the JTD. Section 6 provides important technical information.

1.4 SPECIAL INSTRUCTIONS

N/A.

SECTION 2

APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

The following documents of the versions cited form a part of this requirements specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement. Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting officer.

SPECIFICATIONS

Military

AF TADIL J IMP SPEC	Air Force Tactical Digital Information Link (TADIL) J Implementation Specification, 14 February 1991. (CONFIDENTIAL)
ACCS-A3-407-008C	Interface Specification for Army Data Distribution System (ADDS) Interface (Formerly PLRS/JTIDS Hybrid (PJH) Interface), 10 April 1990.
JCS Pub 6-01.1	Tactical Digital Information Link (TADIL) Message Specification (TADIL A/B), May 1987. (CONFIDENTIAL)
JCS Pub 6-01.2	Tactical Digital Information Link (TADIL) Message Specification (TADIL C), May 1987. (CONFIDENTIAL)
JCS Pub 12	JIOP Volume IV, Part II, Change 1, Description and Procedures, May 1987. (CONFIDENTIAL)
OPSPEC 404.1	Link 4A Operational Specification, 2 September 1983. (CONFIDENTIAL)

STANDARDS

Federal

DOD-STD-2167A   Defense Systems Software Development, 29 February 1988.

DOD-STD-2168   Software Quality Evaluation, 26 April 1985.

FIPS Pub 151-1   Federal Information Processing Standards Publication, POSIX: Portable Operating System Interface for Computing Environments, 28 March 1990.

OSHA   Occupational Safety and Health Act (OSHA), Code of Federal Regulations (CFR), Title 29, Part 1910.

Military

MIL-STD-188-114A   Electrical Characteristics of Digital Interface Circuits, 30 September 1985.

MIL-STD-188-203-1A   Interoperability and Performance Standards for Tactical Digital Information Link (TADIL) A, 8 January 1988.

MIL-STD-188-203-2   Subsystem Design and Engineering Standards for Tactical Digital Information Link (TADIL) B, 23 March 1984.

MIL-STD-188-203-3   Subsystem Design and Engineering Standard for Tactical Digital Information Link (TADIL) C, 5 October 1983.

OTHER PUBLICATIONS

DERG   JITC-JIEO - Tactical Digital Information Link (TADIL) Data Extraction and Reduction Guide (DERG), 15 July 1993. (CONFIDENTIAL)

DX/DR   Navy JTIDS TDMA Data Format Standard, Appendix C to Navy JTIDS DT&E Data Management Plan, 8 September 1988.

JTIDS TIDP-TE (I)   JINTACCS JTIDS Technical Interface Design Plan (Test Edition), Volume I, General (U), Reissue 2, May 1988. (CONFIDENTIAL)

JTIDS TIDP-TE (I-S)	JINTACCS JTIDS Technical Interface Design Plan (Test Edition), Volume I, General (Supplement) (U), Reissue 2, May 1988. (SECRET)
JTIDS TIDP-TE (II)	JINTACCS JTIDS Technical Interface Design Plan (Test Edition), Volume II, Interface Specification (Fixed Word Format) (U), Parts 1 through 4, Reissue 2, May 1988. (CONFIDENTIAL)
JTIDS TIDP-TE (V)	JINTACCS JTIDS Technical Interface Design Plan (Test Edition), Volume V, Data Element Dictionary (U), Parts 1 and 2, Reissue 2, May 1988. (CONFIDENTIAL)
JTIDS TIDP-TE (C)	JINTACCS JTIDS Technical Interface Design Plan (Test Edition), Appendix C: Terms and Definitions, Reissue 2, May 1988. (CONFIDENTIAL)

2.2 NON-GOVERNMENT DOCUMENTS

The following documents of the version cited form a part of this requirements specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement. Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.

ANSI/MIL-STD-1815A	Ada Programming Language, 22 January 1983.
C99ICDVA330, Ch 1	Interface Control Document for the JTIDS Terminal Installed in the E-8 Aircraft, 20 August 1993, with red lines dated 27 September 1993.
C99CDSME004	JTIDS Message Implementation for the TADIL-J Study Contract, 21 August 1992. (CONFIDENTIAL)
IF76301A328A421A	Interface Control Document for JTIDS Terminal Set/F-15 Air Vehicle, 15 April 1991.
JSTARS CDRL 189	Joint-STARS Unique Message Set, 4 December 1989. (CONFIDENTIAL)
JSTARS CDRL 189-1	Joint-STARS Unique Message Set, Change 1, 13 July 1990. (CONFIDENTIAL)

JSTARS CDRL 189-2	Joint-STARS Unique Message Set, Change 2, 18 February 1993. (CONFIDENTIAL)
JSTARS CDRL 15180	Draft 3rd Aircraft Change Pages for the GMSD JTIDS Implementation into GMSD Document Number C99CDSME002, 19 January 1994. (CONFIDENTIAL)
Y207A048E	Interface Control Document Army JTIDS Class 2 Terminal Interface with Army Systems/Elements (Revision E), 7 April 1988.
Y207A050P	Interface Control Document Global Memory Data Format (Revision P), 5 August 1993.
Y207A113G	Interface Control Document Army JTIDS Class 2M Terminal Interface with Army Systems/Elements (Revision G), 3 July 1992.
Y207A114C	Interface Control Document for JTIDS Class 2H Terminal Interface with MCE (Revision C + CIR 1), 7 November 1990.
Y207A122D	Interface Control Document Global Memory Data Format for JTIDS Class 2M Terminal (Revision D), 13 February 1992.
Y207A134J	Interface Control Document for JTIDS Navy Airborne Class 2 Terminal (Revision J), 22 April 1993.
Y207A135R	Interface Control Document for JTIDS Navy Shipboard Class 2 Terminal (Revision R), 9 March 1993.
R207A023D	Interface Control Document Global Memory Data Format for Navy Class 2 Terminals (Revision D), 8 February 1993.
R240A105A0100	Computer Program Development Specification for Data Reduction Program (DRP) JTIDS Terminals, 11 February 1990.
R240A296A0100	Computer Program Development Specification Army Data Distribution System Interface Computer Program for the JTIDS Class 2M Terminal, 19 October 1992.

SECTION 3

SYSTEM REQUIREMENTS

This section defines the functional performance, interface, maintenance, quality-factor, and design requirements and characteristics of the JTD.

3.1 DEFINITION

The JTD equipment suite shall use, to the maximum extent possible, general purpose non-development item (NDI) computers, peripherals and software. The JTD shall provide independent means to test, evaluate, and demonstrate platform/user TADIL or data link implementations during developmental, contractor qualification, operational, field, interoperability, and international testing. The JTD shall also support the function of training host platform operators. The JTD shall support testing and training for systems operating on the following data links: TADIL J/Link 16, and TADIL A/Link 11A, TADIL B/Link 11B, and TADIL C/Link 4. The JTD shall provide two states: an operational state and a maintenance state. The operational state shall include pre-test preparation, test execution, and post test analysis modes. The maintenance state shall include a JTD hardware maintenance mode and a TADIL hardware mode.

3.2 CHARACTERISTICS

3.2.1 Performance Characteristics

3.2.1.1 Multiple TADIL Operation

The JTD shall support multiple TADIL operation. The JTD shall provide the capability to perform pre-test preparation, test execution, and post test analysis functions on the TADILs specified below. The JTD shall allow for the running of each TADIL available individually. The JTD shall support simultaneous operation of TADIL J/Link 16 and TADIL A/Link 11A.

3.2.1.1.1 TADIL J/Link 16 Operation. The JTD shall support TADIL J operation in accordance with (IAW) the applicable references listed in Section 2 of this specification. When operating on TADIL J, the JTD shall provide the capability to simulate up to one thousand (1000) JTIDS units (all the scenario elements) and process up to the equivalent of sixty-four (64) packed 4 (i.e., twelve [12] TADIL J word) TADIL J messages per second in any combination of transmit (i.e., generate) and receive.

3.2.1.1.2 TADIL A/Link 11A Operation. The JTD shall support TADIL A operation in accordance with the applicable references listed in Section 2 of this specification. When

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operating on TADIL A/Link 11A, the JTD shall provide the capability to simulate up to four (4) participating units (PUs) (e.g., land, surface, airborne) one of which may be designated the data net control station (DNCS) and generate up to one hundred fifty (150) tracks for each participating unit.

3.2.1.1.3 TADIL B/Link 11B Operation. The JTD shall support TADIL B operation in accordance with the applicable references listed in Section 2 of this specification. When operating on TADIL B/Link 11B, the JTD shall provide the capability to simulate up to five (5) TADIL B reporting units (RUs) and generate up to two hundred (200) tracks for each reporting unit. The requirements identified below shall be part of its implementation.

3.2.1.1.4 TADIL C/Link 4A Operation. The JTD shall support TADIL C operation in accordance with the applicable references listed in Section 2 of this specification. When operating on TADIL C/Link 4A, the JTD shall provide the capability to simulate one control station and up to six (6) controlled aircraft in any combination of one-way or two-way capabilities and generate up to eighteen (18) tracks for reporting by each of the two-way TADIL C aircraft. The requirements identified below shall be part of its implementation.

3.2.1.1.5 TADIL Message Catalogues. The JTD shall provide the operator with the capability to select which TADIL(s) will be used during a test. The message catalogue resident in the JTD for each TADIL shall be as specified below:

a. TADIL J 1988 (Reissue 2) TIDP-TE with the J28.2.0, 28.2.1, and 28.2.2 messages as specified in the Air Force Implementation Specification cited in Section 2 of this specification and to include the Joint Interface Change Proposals (ICPs) listed in Table 1. The TADIL J catalogue shall also include the J17.3 Radar Service Request/Response, the J17.4 Activity Indicator, and the J18.0 Handover Coordination messages as defined in CDRL 189 and amended by CDRL 189 - Changes 1, Change 2 and CDRL 15180 as cited in Section 2 of this specification. The TADIL J catalogue shall also include the AF Proprietary Messages (28.2.3 Radar Service Request, 28.2.4 Activity Indicator, 28.2.5 Handover Coordination, 28.2.6 Handover Acknowledgment, 28.2.7 Handover Data) as defined in C99CDSME004, "JTIDS Message Implementation for the TADIL J Study Contract" (a.k.a. CDRL 15502).

b. TADIL A/Link 11A in accordance with JCS PUB 6-01.1.

c. TADIL B/Link 11B in accordance with JCS PUB 6-01.1.

d. TADIL C/Link 4A in accordance with JCS PUB 6-01.2.

Table 1. Post Reissue 2 Joint Interface Change Proposals (ICPs)

ICP #	Change #	ICP Name
TJ 464	Change 2	Deletion of End Point
TJ 465	Change 1	Deletion of SPI
TJ 490	Change 2	Addition of Track Vehicle to Platform Type
TJ 491	Change 1	Addition of Airborne Surveillance to Platform and Air Specific Types
TJ 492	Change 3	Addition of STARS to J3.5/J7.0
TJ 90-040	Change 2	Time Slot Reallocation
TJ 91-109	Change 1	Deletion of Special Indicator from J7.0
TM 92-035	Change 2	Points Revision

3.2.1.2 Operational State

The JTD operational state shall support three (3) operational modes: pre-test preparation, test execution, and post test analysis. The JTD shall allow the operator to select and execute these modes without the need for restarting or rebooting. The JTD shall allow the operator to initialize system time or select use of an external time source.

3.2.1.2.1 Pre-Test Preparation Mode. The JTD shall provide the capability to perform the following functions in preparation for conducting a test or exercise: scenario generation, scenario preview, background map generation, TADIL initialization, and printing. This mode shall not require connection to any devices external to the JTD (e.g., TADIL devices, host tactical data system, etc.).

3.2.1.2.1.1 Scenario Generation Function. The JTD shall provide the capability to build and store scenarios. A scenario shall contain, or produce when executed, simulated TADIL messages to be used for stimulating units or platforms under test. The messages shall be time ordered according to operator specified instructions. When operating with more than one data link, the scenario shall be capable of containing a mix of messages from the TADILs selected. When a scenario contains a mix of TADIL messages, it shall be possible to report the same scenario element (e.g., track, PPLI) on multiple TADILs with the same or different track number identifiers (TADIL J TN, DLRN).

Building of a scenario shall be by operator interaction with scenario generation software. The operator will employ display console(s) to facilitate scenario generation and preview. Data entry devices (e.g., keyboard, pointing device) in conjunction with display(s) shall provide the capability to create, delete, modify, name, preview, rename, retrieve, and save scenarios. The JTD shall include, as a minimum, the following scenario generation capabilities.

3.2.1.2.1.1.1.1 Message Generation. The JTD shall generate and process messages for scenarios in accordance with the TADIL message catalogues specified in paragraph 3.2.1.1.5 of this specification. The JTD shall provide help to the operator in the form of message format templates, including default values for all fields, for all messages in accordance with the selected TADIL message catalogues. The JTD shall perform syntax and range checks on operator input message data and warn the operator of detected violations. The JTD shall identify the nature of this violation and allow such violations either to be corrected by the operator or to be accepted after an operator selects to override the warning.

3.2.1.2.1.1.1.1.1 Recurrent Scenario Element Messages. The JTD shall be capable of generating scenarios containing recurring messages reporting the position of scenario elements (e.g., tracks, PPLIs, sensor targets) for up to one thousand (1000) simultaneously active scenario elements. The JTD shall accept an initial operator entry of message content and an operator specified start time, message recurrence rate and duration for these messages and shall automatically build subsequent messages for transmission. Default recurrence rate shall be as defined in the message standard references cited in Section 2 of this specification. For moving elements the JTD shall, based on the velocity data in the message, extrapolate the position of the element to the next time of transmission and insert this position data into the message that it builds.

3.2.1.2.1.1.1.1.1.1 Element Change Events. The JTD shall allow the operator to prescript changes to the data contents of the message reporting a scenario element up to fifty (50) times during the scripted life of the scenario element. Each time that data is changed, called an element change event, any data within the message shall be capable of being changed. Changes in position data resulting from extrapolation by the JTD shall not be considered change events.

3.2.1.2.1.1.1.1.1.1.1 Trajectory Generation. To facilitate the specification of change events for moving elements, the JTD shall calculate moving element trajectories by accepting operator entries for element waypoints along the trajectory. The JTD shall accept the entry of the position of a waypoint through the use of a pointing device on the Display Console(s), either against a geographical background map or no map background. The JTD shall automatically determine the position of each waypoint and display it to the operator. The JTD shall also provide the capability to enter a waypoint position by keyboard entry.

3.2.1.2.1.1.1.1.1.1.1.1 Waypoints. The parameters of a trajectory element change event, called a waypoint, shall include time of arrival, position, course, speed and altitude. The JTD shall accept operator specification of partial parameters and shall calculate the remaining parameters. If position and time are entered for a waypoint, the JTD shall calculate the speed and course required at the previous waypoint in order to arrive at the second waypoint at the specified time. If no time of arrival is entered for a waypoint, the JTD shall calculate the required course at the previous waypoint, and shall calculate the time of arrival at the waypoint being specified based on the speed at the previous waypoint. The JTD shall accommodate the generation of time coordinated (e.g., intercept) trajectories by accepting operator entry of time

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and position of a waypoint in the middle of the trajectory, and then calculating the time or speed of previous waypoints. Altitude shall remain the same at a waypoint unless changed by the operator.

3.2.1.2.1.1.1.1.1.1.2 Special Trajectories. The JTD shall aid the operator in the creation of more complex trajectories. As a minimum, the JTD shall accept operator entries to create and compute circular, racetrack and figure eight trajectories.

3.2.1.2.1.1.1.2 Non-Recurrent and Recurrent (Non-position) Messages. The JTD shall provide for the generation of up to one thousand (1000) simulated non-recurrent messages or recurrent messages not related to position (e.g., Command and Control) over the duration of the scenario. The JTD shall accept operator specified time of transmission for the non-recurrent messages. For a recurrent non position message, the JTD shall accept a specified start time, end time, and an associated transmission recurrence rate, and shall automatically generate copies of the message at the specified rate during the specified time. Specification of a recurrent message in this manner shall count as only one message in the total of one thousand (1000).

3.2.1.2.1.1.1.3 Scenario Summaries. The JTD shall generate, display and store a scenario summary file for each generated scenario. The scenario summary file shall contain, as a minimum, the number of elements in the scenario, the maximum number of simultaneously active elements, their platform types, track numbers, a list of message types contained in the scenario, and the maximum number of JTIDS messages per twelve second frame in each NPG. The message to NPG association shall be in accordance with the TADIL J TIDP referenced in Section 2, except that simulated PPLI messages shall be associated with NPG 7 (Surveillance). The JTD shall display the scenario summary file upon operator request.

3.2.1.2.1.1.1.4 Scenario Files. The JTD shall generate scenario files that, when processed in test execution mode, shall result in transmission of simulated recurrent position/track reports messages describing the operator prescribed scenario elements and non-recurrent operator prescribed messages not related to position. The JTD shall generate scenarios of up to eight (8) hours in duration. The JTD shall be capable of storing three (3) or more scenarios.

3.2.1.2.1.1.1.5 Message Rates. The JTD shall be capable of generating a scenario containing the equivalent of sixty-four (64) packed 4 (i.e., twelve [12] TADIL J word) TADIL J messages per second. For TADILs A, B, and C, the maximum message rate shall conform to the requirements identified in paragraphs 3.2.1.1.2 thorough 3.2.1.1.4 of this specification respectively.

3.2.1.2.1.1.1.6 Scenario Special Test Messages. The JTD shall accept operator entry to create a new TADIL message. New TADIL messages are not required to have any checks for correctness and shall allow maximum flexibility to the operator for negative testing and new message initial checkout. As a minimum, the new special message shall be entered by the

operator in hexadecimal or octal format. The JTD shall provide the capability to include these messages in the scenario. The JTD shall enable the operator to generate a sequence of messages that shall only require the operator to edit specific fields that change.

3.2.1.2.1.2 Scenario Preview Function. The JTD shall provide the operator with the following capabilities to preview the contents of a scenario.

3.2.1.2.1.2.1 Preview Speeds. The JTD shall, as a minimum, preview a scenario on the display(s) at rates including one half (1/2), one (1), and five (5) times the real scenario execution time. The preview rate shall be selectable by the operator.

3.2.1.2.1.2.2 Preview Controls. The JTD shall implement operator controls to manipulate (e.g., forward, stop, fast forward, reverse, fast rewind, restart, etc.) the previewing of a scenario. The JTD shall also allow the operator to move to a specific time on the scenario.

3.2.1.2.1.2.3 Plotted Trajectory Preview. The JTD shall provide a capability to display all plotted trajectories, on the situation display subfunction, over an operator specified time window.

3.2.1.2.1.3 Background Map Generation Function. The JTD shall provide all required software to create background maps and overlays used by the JTD. The JTD shall use Defense Mapping Agency (DMA) cartographic data (e.g., Digital Feature Analysis Data [DFAD]) to generate background maps. The JTD shall function without the need for a map or any overlays. The JTD shall provide, as a minimum, the following capabilities.

3.2.1.2.1.3.1 Map Capacity. The JTD shall generate, accept and display background map data for any part of the world at scales up to two thousand forty-eight (2048) by two thousand forty-eight (2048) data miles. The JTD shall allow the operator to save all generated maps to external storage medium. The JTD shall allow storage of up to three (3) maps on internal storage medium. The JTD shall allow loading of maps to/from external storage. A background map shall differentiate geographical items such as water, land, and political-geographical boundaries, as well as Latitude and Longitude lines, by color and pattern.

3.2.1.2.1.3.2 Map Overlays. The JTD shall provide for the building of map overlays to be displayed concurrently with the geographical background maps when selected by the operator. Map overlays shall consist of line drawn figures and special interest landmarks. A combination of color and line pattern characteristics shall be provided to differentiate and generate such line drawn figures as airways, areas, corridors, lanes, routes, and zones, etc. Special interest landmarks such as cities, commercial and military facilities (e.g., airfields, naval ports, control and reporting centers, control and reporting posts, sector operations center, missile sites, etc.), shall be displayed by a unique symbol designator and up to twelve (12) alphanumeric characters.

3.2.1.2.1.4 TADIL Initialization Function. The JTD shall provide the capability to provide all initialization data required to operate on TADILs J, A, B and C.

3.2.1.2.1.4.1 JTIDS Terminal Initialization Load Generation. The JTD shall provide the capability to generate and modify JTIDS terminal initialization loads from operator inputs. Inputs shall consist of operator entries for all JTIDS terminal initialization data items contained in the JTIDS ICDs referenced in Section 2 and Table 2 of this specification. The JTD shall verify that operator inputs for any initialization data item are within the appropriate range or in the set of permissible values for that item, independent of all other data items. The JTD shall report any errors found to the operator. Further, this function shall convert the initialization data into a storage format compatible for reading and transfer to the associated JTIDS terminal. This function shall be capable of accepting and storing the JTIDS initialization data in a format compatible with the JTIDS Network Design Aid (NDA) as detailed in paragraph 6.2 of this specification. The JTD shall have the capability to manipulate this data using the DAMSL editing tool set.

Table 2. JTD Supported Terminals and Interface Control Documents (ICDs)

Terminal Type	ICD	Date
Army Class 2	Y207A048E	7 April 1988
Navy Air	Y207A134J	22 April 1993
Navy Ship	Y207A135R	9 March 1993
F-15/Joint STARS	IF76301A328A421A/C99ICDVA330	15 April 1991/ 20 August 1993
Modular Control Equipment (MCE)	Y207A114C + CIR 1	7 November 1990
Army Class 2M	Y207A113G/R240A296A0100	3 July 1992/19 October 1992

3.2.1.2.1.4.2 TADIL A/Link 11A Initialization. The JTD shall support TADIL A operation in accordance with the applicable references listed in Section 2 of this specification. When operating on TADIL A/Link 11A, the JTD shall provide the capability to initialize a network containing up to four (4) participating units (PUs) (e.g., land, surface, airborne) one of which may be designated the data net control station (DNCS). The JTD shall provide the capability for the operator to edit the information (e.g., DLRP and PU Addresses) contained in paragraph 4.3 of JCS Pub 12, Volume IV, Part II, Change 1.

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3.2.1.2.1.4.3 TADIL B/Link 11B Initialization. The JTD shall support TADIL B operation in accordance with the applicable references listed in Section 2 of this specification. When operating on TADIL B/Link 11B, the JTD shall provide the capability to initialize up to five (5) links with five (5) different TADIL B reporting units (RUs). The JTD shall provide the capability for the operator to edit the information (e.g., DLRP and RU Addresses) contained in paragraph 4.7 of JCS Pub 12, Volume IV, Part II, Change 1.

3.2.1.2.1.4.4 TADIL C/Link 4A Initialization. The JTD shall support TADIL C operation in accordance with the applicable references listed in Section 2 of this specification. When operating on TADIL C/Link 4A, the JTD shall provide the capability to initialize a network containing one control station capable of controlling up to six (6) controlled aircraft. The JTD shall provide the capability for the operator to edit the information (e.g., DLRP and PU Addresses) contained in OPSPEC 404.1.

3.2.1.2.1.5 Pre-Test Print Function. Upon operator selection, the JTD shall be capable of printing the summary scenario file for a scenario. The JTD shall print TADIL initialization data files. The JTD shall print JTIDS initialization data in a format that includes labeling for parameter names in English abbreviations or acronyms and all parameter values in English abbreviations, acronyms or numerical units compatible with the ICDs cited in Table 2 of this specification, or hexadecimal format, selectable by the operator. Upon operator selection, the JTD shall print the contents of the message templates used in the specification of the scenario. The JTD shall allow printing in Data Extraction Reduction Guide (DERG) format.

3.2.1.2.2 Test Execution Mode. The JTD shall provide a set of functions associated with the actual performance of a test or exercise. The functions available during test execution shall include initialization of the JTIDS terminal and TADILs A, B and C, on-line TADIL initialization changes, on-line message generation and transmission, scenario execution, message transfer and processing, display of track information and message data, printing of information of interest, receipt compliance on all TADIL links, data recording, JTIDS terminal initialization emulation and JTIDS terminal status emulation. Except for terminal initialization and emulation functions, performance of the functions in this mode shall not require connection to any devices external to the JTD (e.g., TADIL devices, host tactical data system, etc.) nor require the execution of a scenario. The JTD shall be capable of operating in three (3) distinct functional JTIDS configurations: host surrogate, JTIDS surrogate, or JTIDS interface monitor. Table 3 of this specification details the functions that the JTD shall perform in each JTIDS configuration.

3.2.1.2.2.1 Host Surrogate Configuration (HSC). In this text execution configuration, shown in Figure 1, the JTD shall connect to the TADIL devices over the normal host to TADIL device data interface port(s) in accordance with the JTIDS Interface Control Documents (ICDs) and Military Standards listed in Section 2 and Table 2 of this specification. When operating in this configuration, the JTD shall be capable of the following functions.

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Table 3. Test Execution Functions Versus Functional Configurations

Test Execution Functions	Host Surrogate	JTIDS Surrogate	JTIDS Interface Monitor
JTIDS Terminal Initialization	X		
TADIL A Initialization	X	X	
TADIL B Initialization	X	X	
TADIL C Initialization	X	X	
On-Line TADIL Initialization Change	X	X	
On-Line Message Generation	X	X	
Scenario Execution	X	X	
Message Transfer and Processing	X	X	X
Display	X	X	X
Printing	X	X	X
Message Receipt Compliance	X	X	
Data Recording	X	X	X
JTIDS Terminal Initialization Emulation		X	
JTIDS Terminal Status Emulation		X	

3.2.1.2.2.1.1 HSC TADIL Initialization Function. The JTD shall provide a capability for the operator to control the transfer of TADIL initialization data loads from the JTD to a connected TADIL transmission device, if required. During and upon completion of the transfer of a complete terminal initialization data load to the JTIDS terminal, this function shall monitor terminal initialization status and report this status to the operator. The JTD shall provide the capability for the operator to request and store the JTIDS terminal initialization data from the JTIDS terminal.

3.2.1.2.2.1.2 HSC On-Line TADIL Initialization Change Function. The JTD shall provide the capability to change TADIL initialization data after an exercise has been started. Inputs shall consist of operator entries for all TADIL initialization data items identified in paragraphs 3.2.1.2.1.4 through 3.2.1.2.1.4.4 of this specification. The JTD shall verify that inputs are within the appropriate range or in the set of permissible values and report any errors to the operator.

3.2.1.2.2.1.3 HSC On-Line TADIL Message Generation Function. The JTD shall provide on-line generation for TADILs J, A, B and C messages. On-line message generation shall include, as a minimum, the capabilities listed below.
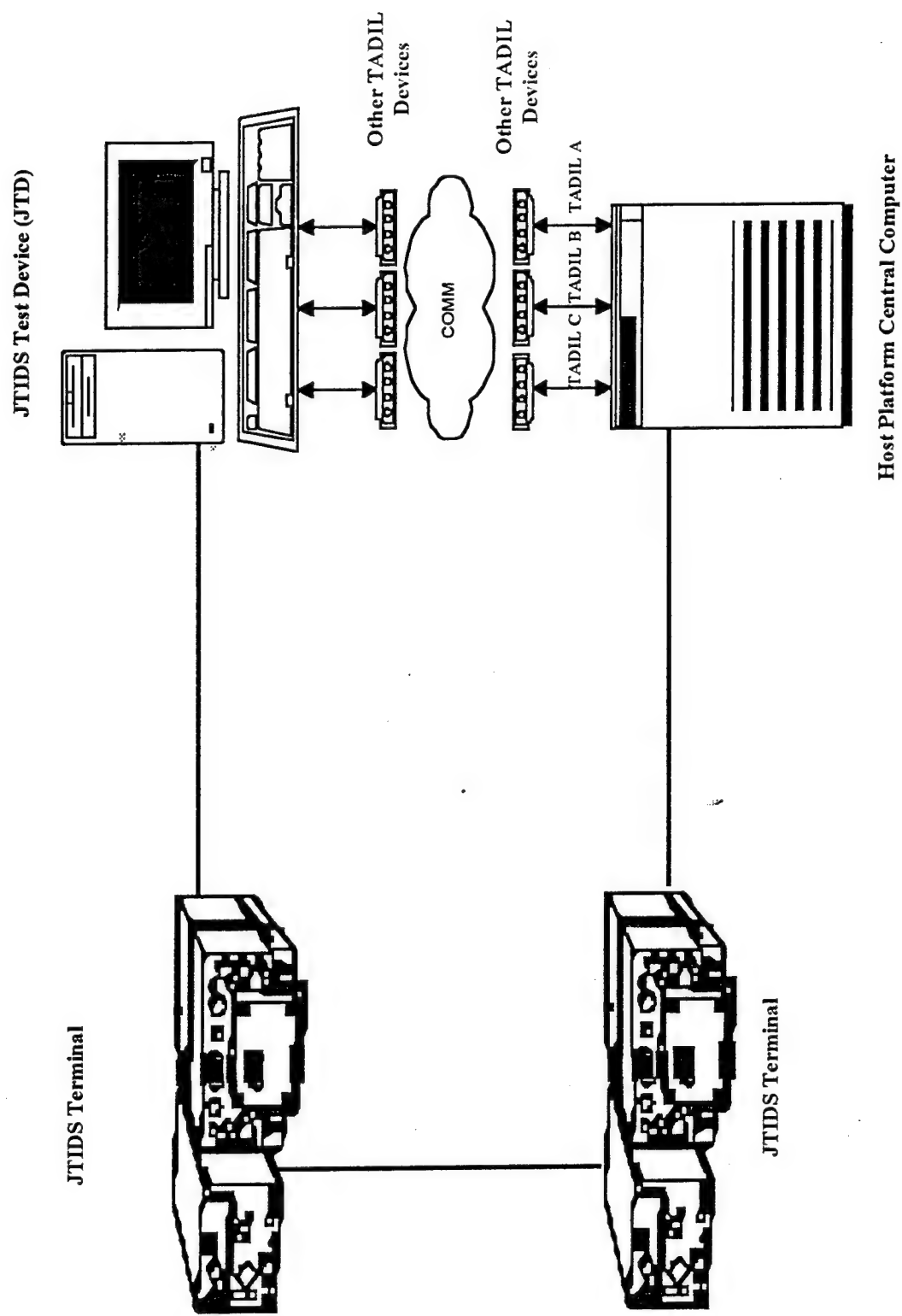
Figure 1. Host Surrogate Configuration

JTIDS Test Device (JTD)

Other TADIL Devices

Other TADIL Devices

COMM

TADIL A

TADIL B

TADIL C

TADIL C

Host Platform Central Computer

JTIDS Terminal

JTIDS Terminal

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3.2.1.2.2.1.3.1 Generation and Processing. The JTD shall provide the operator with the capability to generate and process the message types selected in paragraph 3.2.1.1.5 of this specification. The JTD shall help the operator in the scripting of these messages. The JTD shall provide a default message format template for all messages, perform syntax and range checks on operator input message data, and warn the operator if a violation has been detected. The JTD shall identify the nature of this violation, and allow such messages to either be corrected or be sent after the operator selects to override the warning. For all TADIL J messages, the JTD shall provide the capability for the operator to specify the NPG that the message will be transmitted on. Default NPGs shall be in accordance with the TADIL J TIDP listed in Section 2 of this specification, except that simulated PPLI messages shall be defaulted to NPG 7 (Surveillance).

3.2.1.2.2.1.3.2 On-Line Non-Recurrent Messages. The JTD shall provide the operator the capability to generate, on-line, simulated non-recurrent messages. The JTD shall automatically provide for messages that require a single or multiple non-recurring transmissions to be transmitted in accordance with message standard transmit rules of the references cited in Section 2 of this specification. The message shall be transmitted at the time directed by the operator. The last message transmitted shall be retained for review or retransmission.

3.2.1.2.2.1.3.3 On-Line Recurrent Element Messages. The JTD shall provide the operator the capability to generate, on-line, recurring element position messages (e.g., Tracks, PPLIs, Target Sorting) up to a maximum of one thousand (1000) simultaneously active elements including scenario scripted elements. The JTD shall accept operator specified message recurrence rate for these messages. Default recurrence rates shall be as defined in the message standard references cited in Section 2 of this specification. The JTD shall extrapolate position updates for these messages at the specified recurrence rate. The capability shall be provided for the operator to stop transmission of these messages or to change the data field contents of these messages during transmission. Extrapolation of position for future recurrent transmissions shall be based upon the last entered position, speed and heading.

3.2.1.2.2.1.3.4 Special Test Messages. The JTD shall provide the operator with the capability to generate and process special test messages. The special test message will be in hexadecimal or octal format as selected by the operator. The JTD shall not perform any checks for correctness in order to allow maximum flexibility to the operator for negative testing and new message checkout. The last special test message transmitted for each TADIL shall be retained for review or retransmission.

3.2.1.2.2.1.3.5 Prescripted Messages. The JTD shall provide the operator with the capability to store up to fifty (50) prescripted messages in a special message file. These prescripted messages shall be generated in accordance with paragraphs 3.2.1.2.2.1.3 through 3.2.1.2.2.1.3.4 of this specification. The operator shall be provided the capability to add, delete, and modify messages contained in the prescripted file. The operator shall be provided the capability to transmit any of the stored messages once, upon operator action, or for an

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operator specified duration and at a specified rate. For prescripted messages reporting moving elements, the JTD shall provide the option to extrapolate position based on speed and heading in the message and transmit the extrapolated position in each transmission of the message. The JTD shall provide the capability for the operator to designate TADIL J messages that shall be prepackaged together for transfer to the JTIDS terminal behind a single common carrier header in accordance with the JTIDS ICDs listed in Table 2 of this specification.

3.2.1.2.2.1.4 HSC Scenario Execution Function. The JTD shall provide the operator with the capability to execute a scenario created in accordance with paragraphs 3.2.1.2.1.1 through 3.2.1.2.1.1.1.6 of this specification. The JTD shall, as a minimum, provide for the capabilities listed below.

3.2.1.2.2.1.4.1 Scenario Execution Control. The JTD shall provide for operator control of the processing of a scenario. The JTD shall provide the operator with the capability to activate, de-activate, or delete scripted scenario element(s). When a scripted scenario element is active, it shall be extrapolated (if moving) and transmitted by the JTD. When a scripted scenario element is not active, it shall continue to be extrapolated (if moving) but shall not be transmitted by the JTD. When deleted, a scenario element shall be dropped from the scenario and transmission by the JTD shall cease. The JTD shall also cease reporting all scenario messages whose source is a deleted or inactive element. The JTD shall provide the operator with the capability to specify changes to the message reporting a scenario element during scenario execution. These changes shall be limited to data not associated with the trajectory of an element (e.g., position, speed, course, IFF/SIF codes).

3.2.1.2.2.1.4.1.1 Redirecting Elements. The JTD shall provide the capability for the operator to redirect any scripted scenario elements by changing the speed, course, and/or position of the element. Upon operator specification of a redirection, the JTD shall ignore all further prescripted trajectory waypoints for the affected element and continue updating based upon the redirection specification (e.g. course, speed, etc.).

3.2.1.2.2.1.4.2 Execution Timing. The JTD shall maintain and update time dependent scenario data. The JTD shall transmit recurring messages at scenario elapsed times based on the recurrence rate specified by the operator during the scenario generation. The JTD shall stop transmitting recurring messages after the duration specified by the operator during the scenario generation or when deleted by the operator manually.

3.2.1.2.2.1.4.3 Scenario Filters. The JTD shall implement scenario filters that will enable tailoring of a specific scenario. Upon operator selection, the filters shall operate as either pass through or rejection. Scenario filters shall include, as a minimum, TADIL source, message type, source track number, identity, and track number. The operator shall be capable of specifying up to 12 scenario filters separately or in combination prior to execution or at any time during the execution of the scenario. The filters employed during the execution of a scenario shall be displayed to the operator.

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3.2.1.2.2.1.5 HSC Message Transfer and Processing Function. The JTD shall transfer to the TADIL devices messages generated in accordance with paragraphs 3.2.1.2.2.1.3 through 3.2.1.2.2.1.4.3 of this specification for transmission in accordance with the JTIDS ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall accept message traffic from the TADIL devices in accordance with the ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall process a combination of scenario, on-line, and live message data up to the equivalent of sixty-four (64) packed 4 TADIL J messages (i.e., twelve [12] TADIL J words) per second and the maximum message rate for the other TADILs identified in paragraphs 3.2.1.1.2 through 3.2.1.1.4 of this specification with no data lost.

3.2.1.2.2.1.6 HSC Display Function. The JTD shall provide two subfunctions for the display of graphics situation and text information that operate simultaneously and independently. Operation of each subfunction shall present flicker free and jitter free information. The display function shall support a cursor controlled by a pointing device and a keyboard.

3.2.1.2.2.1.6.1 Situation Display Subfunction. The JTD shall provide a color graphics pictorial representation of the test activities for track/point elements, lines and areas. The JTD shall provide graphic symbology (symbol set) used to represent scenario and live participants. The JTD shall differentiate between friendly, unknown, and hostile items by using the colors green, yellow, and red respectively. The JTD shall have the capability to store multiple symbol sets. The Situation Display Subfunction shall, as a minimum, provide the capabilities listed below.

3.2.1.2.2.1.6.1.1 Scaling. The JTD shall implement operator controls to zoom in, zoom out, and freeze the situation display. The JTD shall provide display scales among eight (8) by eight (8) data miles and one thousand twenty-four (1024) by one thousand twenty-four (1024) data miles. The JTD shall support at least six (6) zoom in and zoom out levels between the largest and smallest scales. The zoom in and zoom out levels shall be sixteen (16) by sixteen (16), thirty-two (32) by thirty-two (32), sixty-four (64) by sixty-four (64), one hundred twenty-eight (128) by one hundred twenty-eight (128), two hundred fifty-six (256) by two hundred fifty-six (256) and five hundred twelve (512) by five hundred twelve (512) data miles. The JTD shall also provide a display scale of two thousand forty-eight (2048) by two thousand forty-eight (2048) data miles.

3.2.1.2.2.1.6.1.2 Cursor Control. The JTD shall display map data, as specified in paragraph 3.2.1.2.1.3 of this specification, with the capability to display Latitude/Longitude and GEOREF readouts of cursor position and center the graphics situation subfunction area anywhere on the displayed map. The JTD shall provide the operator with the capability to select or deselect the map and all map overlays for display.

3.2.1.2.2.1.6.1.3 Track/Point Elements. The JTD shall display, as a minimum, four hundred (400) track/point elements with data blocks, or six hundred (600) track/point elements

without data blocks. Track/point elements can be any combination of manually, net and scenario initiated elements. Manually initiated track/point elements are those elements created in accordance with paragraphs 3.2.1.2.2.1.3 through 3.2.1.2.2.1.3.5 of this specification. Net initiated track/point elements are those elements received from any TADIL interface. Scenario initiated track/point elements are those created in accordance with paragraphs 3.2.1.2.1.1 through 3.2.1.2.1.1.1.6 of this specification.

3.2.1.2.2.1.6.1.4 Message Originated Lines and Areas. The JTD shall display up to twenty (20) lines and up to ten (10) areas reported in simulated (i.e., JTD generated) or received messages. Each line or area shall consist of up to 20 line segments.

3.2.1.2.2.1.6.1.5 Display Information. The JTD shall provide displayed information for each element and area. It shall consist of an element symbol, an element data block, and for moving elements, a speed and heading vector. The element data block shall be adjacent to the element symbol not overwriting the speed and heading vector. The speed and heading vector shall be proportional in size to the speed of the moving track/point element. The display shall differentiate between JTD generated elements (i.e., scenario and manually generated) and live (i.e., net generated) elements.

3.2.1.2.2.1.6.1.6 Track Data Blocks. The JTD shall provide a data block that shall contain, as a minimum, the track number or call sign, speed, simulation indicator, altitude, strength, platform identification information, and the TN or target sorting index number of the paired element . The JTD shall provide data block options, selectable by the operator for single elements or for all displayed elements at once, as either no data block, full data block, or partial data block containing a subset of information (e.g., TN or voice call sign) available in the full data block.

3.2.1.2.2.1.6.1.7 Stale Element Removal. The JTD shall automatically remove stale elements when reporting on an element that has stopped being reported. The removal shall occur after an elapsed time of seventy-two (72) seconds for air tracks and non-ground platform elements. Removal for all ground elements shall be five (5) minutes after the last report was received. In all case of removal, the JTD shall notify the operator at the halfway removal point that an element has staled.

3.2.1.2.2.1.6.1.8 Display Filters. The JTD shall implement display filters to declutter the situation display subfunction individually for each display. Display filters shall include, as a minimum, TADIL source, live/simulated, message type, source track number, identity, track number, transmit/receive, map/no map, points, lines, areas, speed, heading, and altitude. Upon operator selection, the filters shall operate as either pass through or rejection. The JTD shall implement up to 12 display filters separately or in any combination at any time while in Test Execution Mode. An indication of the filter(s) in effect shall be provided to the operator. The selected filters shall take effect within 1 second of the operator switch action.

3.2.1.2.2.1.6.1.9 Hooking. The JTD shall provide the capability for the operator to hook up to five (5) displayed entities. For each hooked entity, the JTD shall display on the Text Display Subfunction all message data associated with the entity.

3.2.1.2.2.1.6.1.10 Display Controls. The JTD Situation Display shall provide the operator a capability to control scenario element activation/deactivation, scenario start/stop/speed/freeze, object deletion, and selection of real time events pertaining to operator generated and scripted scenario elements, as specified in paragraph 3.2.1.2.2.1.4.1 of this specification.

3.2.1.2.2.1.6.2 Text Display Subfunction. The JTD shall display textual information on test execution activities for the message types identified in paragraph 3.2.1.1.5 of this specification. The Text Display Subfunction shall, as a minimum, provide the capabilities listed below.

3.2.1.2.2.1.6.2.1 Hooked Entities of Interest. The JTD shall display message data for a minimum of five (5) hooked entities of interest. Data displayed shall include all data fields of all the messages reporting on the entity of interest. The data shall be displayed as full message reports including labeling for message fields in English abbreviations or acronyms and all message field values in English abbreviations or acronyms or numerical units compatible with the message standards cited in Section 2 of this specification. Upon operator selection, the JTD will allow display of hooked entities in DERG format. The data shall be updated as new message data is received.

3.2.1.2.2.1.6.2.2 Scrolling. The JTD shall provide a message scrolling capability for all message types and be subject to filtering as defined below. The scrolling display shall display a minimum of six (6) messages at one time. The format of this text shall be as full message reports including labeling for message fields in English abbreviations or acronyms and all message field values in English abbreviations or acronyms or numerical units compatible with the message standards cited in Section 2 of this specification. Upon operator selection, the JTD will allow display of scrolling in DERG format. The operator shall be able to pause message scrolling and restart it. During a pause, the operator shall be able to page back for display of up to the last thirty two (32) messages. At restart, the scrolling shall buffer the most recently received sixteen (16) messages for display.

3.2.1.2.2.1.6.2.2.1 Scrolling Filters. The JTD shall implement scrolled message filters at the selection of the operator. These message filters shall include, as a minimum, TADIL, live/simulated, message type, source track number, identity, track number and transmit/receive. Upon operator selection, the filters shall operate as either pass through or rejection. The operator shall be capable of specifying up to 12 scrolling filters separately or in combination prior to scrolling or at any time while scrolling is enabled.

3.2.1.2.2.1.6.2.3 Addressed Messages. The JTD shall display received and transmitted addressed messages in text format. The operator shall be capable of selecting up to any

combination of four addressees or sources (including the JTD) for which addressed messages will be displayed. The JTD shall provide an addressed message display buffer or queue containing a minimum of thirty-two (32) messages. The JTD shall alert the operator when an addressed message is contained in the queue. The JTD shall provide the capability to select from the buffer/queue messages for display and to delete messages from the queue.

3.2.1.2.2.1.6.2.4 JTIDS Terminal Status Parameters. When selected by the operator, the JTD shall provide, as a minimum, a display of the JTIDS ongoing terminal status parameters in accordance with Table 4 of this specification. The JTD shall continuously refresh the display to indicate a change of state for any item.

Table 4. JTIDS Terminal Status Parameters

MCE	Army Cl 2	Army Cl 2M	F-15/JSTARS	Navy Air	Navy Ship
Status Block 1 Words 3, 4	Status Block 1 Words 25, 26	LCN 3 Block 1 Words 3, 4	Status Block 1 Words 3 and 4	Status Block 1 Words 3 and 4	Status Block 1 Words 3 and 4

3.2.1.2.2.1.6.2.5 TADIL Messages Statistics. When selected by the operator, the JTD shall provide a continuously updated display of the JTIDS terminal message statistics shown in Table 5 of this specification. The JTD shall update this information every twelve (12) seconds. The JTD shall also display the number of messages received, the number of messages transmitted, and the number of messages received in error for TADILs A, B, and C and update this information every 12 seconds.

3.2.1.2.2.1.6.2.6 TADIL Initialization Parameters. When selected by the operator, the JTD shall display the current TADIL initialization parameters. The format of the display shall include parameter names in English abbreviations or acronyms and all parameter values in English abbreviations or acronyms or numerical units compatible with the ICDs/references cited in Section 2 and Table 2 of this specification.

3.2.1.2.2.1.7 HSC Printing Function. Upon operator selection, the JTD shall print all message traffic, terminal status, statistics, etc., during the mission at a minimum rate of twelve hundred (1200) lines per minute. Upon operator selection, the JTD shall perform a "print screen" function for the contents of the text display subfunction. The JTD shall buffer messages for printing in order to accommodate message surges. The JTD shall buffer a minimum of 1 second's worth of message data in accordance with the maximum data rates identified in paragraphs 3.2.1.1.1 through 3.2.1.1.4 of this specification. If the buffer

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overflows, the operator shall be notified. Upon operator selection, the JTD shall print in one of three format types.

Table 5. JTIDS Terminal Message Statistics

Number of TADIL J Successful Transmissions Received During the Last Reporting Period
Number of TADIL J RTT Interrogations Transmitted During the Last Reporting Period
Number of TADIL J RTT Replies Received During the Last Reporting Period
Number of TADIL J Transmissions Received in Error During the Last Reporting Period
Number of TADIL J Messages Not Acknowledged During the Last Reporting Period
Number of TADIL J Loopback Fails During the Last Reporting Period
Number of TADIL J Loopback Time of Arrival (TOA) Fails During the Last Reporting Period
Number of TADIL J Loopback Fails (No Loopback) During the Last Reporting Period
Number of Successful TADIL J Loopbacks During the Last Reporting Period
Number of TADIL J Test Message Bit By Bit Compare Fails During the Last Reporting Period
Number of Successfully Received TADIL J Test Messages During the Last Reporting Period
Number of IJMS Messages Received During the Last Reporting Period
Number of IJMS Messages Received in Error During the Last Reporting Period
Number of IJMS Messages Not Acknowledged During the Last Reporting Period
Number of IJMS Loopback Compare Failures During the Last Reporting Period
Number of IJMS Loopback Failures During the Last Reporting Period
Number of IJMS Successful Loopbacks During the Last Reporting Period
Number of IJMS Test Message Compare Fails During the Last Reporting Period
Number of Successfully Received IJMS Test Messages During the Last Reporting Period

3.2.1.2.2.1.7.1 Type 1 Format. The JTD shall provide a full message report, including labeling for message fields in English abbreviations or acronyms and all message field values in English abbreviations, acronyms or numerical units compatible with the message standard references cited in Section 2 of this specification.

3.2.1.2.2.1.7.2 Type 2 Format. The JTD shall provide a partial message report for position/track messages, containing message type, source track number, identification, altitude, heading, latitude and longitude, and speed compatible with the appropriate message standard references cited in Section 2 of this specification.

3.2.1.2.2.1.7.3 Type 3 Format. The JTD shall provide a hexadecimal full message report or in DERG format.

3.2.1.2.2.1.7.4 Print Filtering. Upon operator selection, the JTD shall provide for filtering of messages for printing. As a minimum, the JTD shall provide the operator with the capability to specify filters to include TADIL source, live/simulated, message type, source track number, identity, and track number. Upon operator selection, the filters shall operate as either pass through or rejection. Print filtering in the full message format shall include the capability for the operator to specify up to twelve (12) filter settings separately or in combination prior to printing or at any time while printing is enabled.

3.2.1.2.2.1.7.5 TADIL Initialization Data Parameters. Upon operator selection, the JTD shall print the initialization parameters currently held by the JTIDS terminal or the initialization data for TADILs A, B, and C. The format for the JTIDS printouts shall include parameter names in English abbreviations or acronyms and all parameter values in English abbreviations, acronyms or numerical units compatible with the JTIDS ICDs cited in Section 2 and Table 2 of this specification or in hexadecimal format. The format for the other TADIL printouts shall include parameter names in English abbreviations or acronyms and all parameter values in English abbreviations, acronyms or numerical units compatible with the associated documents contained in Section 2 of this specification or in hexadecimal format.

3.2.1.2.2.1.7.6 TADIL Message Statistics. Upon operator selection, the JTD shall print the JTIDS terminal 12 second message statistics shown in Table 5 of this specification. These statistics shall be printed when received until the print function is disabled by the operator. The JTD shall also print the number of messages received, the number of messages transmitted, and the number of messages received in error for TADILs A, B, and C.

3.2.1.2.2.1.8 HSC Message Receipt/Compliance Function. The JTD shall provide the operator with the capability to acknowledge messages requiring R/C that are addressed to the JTD. Acknowledgment options shall consist of WILCO, HAVCO, and CANTCO. When selected, an acknowledgment shall cause the correct response message to be generated for transmission to the originating platform. For JTD originated messages requiring a response, the JTD shall alert the operator to the reception of a response, and shall also alert the operator when a response has not been received within an operator specified time-out period.

3.2.1.2.2.1.9 HSC Data Recording Function. The JTD shall provide the capability to record maximum message traffic (a composite transmit/receive message rate equivalent to sixty-four (64) packed 4 (i.e., twelve [12] TADIL J words) TADIL J messages per second) between the JTD and its connected terminal or host and the maximum message rate for the other TADILs identified in paragraphs 3.2.1.1.2 through 3.2.1.1.4 of this specification. Recording for TADIL A, TADIL B, and TADIL J shall be in DERG format. Recording of data links messages in TADIL C shall be in Data Extraction/Data Reduction (DX/DR) format. The JTD shall record message data that originated from the scenario, from the on-line message generation, and from the live network elements.

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3.2.1.2.2.2 JTIDS Surrogate Configuration (JSC). In this test execution configuration, shown in Figure 2, the JTD shall support connection to a JTIDS host platform over the normal host to JTIDS terminal data interface in accordance with the JTIDS ICDs listed in Section 2 and Table 2 of this specification. When operating in this configuration, the JTD shall emulate the JTIDS terminal by accepting TADIL J messages and terminal initialization data from the host and transferring simulated messages and stored initialization data and terminal status to the host. The JTD shall allow the other TADILs, if active, to perform as in the host surrogate configuration and as specified below. When operating in the JSC, the JTD shall connect to other TADIL devices in accordance with the Military Standards listed in Section 2 of this specification.

3.2.1.2.2.2.1 JSC On-Line TADIL Message Generation Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.3 through 3.2.1.2.2.1.3.5 of this specification.

3.2.1.2.2.2.2 JSC Scenario Execution Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.4 through 3.2.1.2.2.1.4.3 of this specification.

3.2.1.2.2.2.3 JSC JTIDS Terminal Initialization Emulation Function. The JTD shall accept JTIDS terminal initialization data loads or changes from the host platform in accordance with the ICDs listed in Section 2 and Table 2 of this specification. The JTD shall provide proper terminal handshaking responses in accordance with the ICDs listed in Section 2 and Table 2 of this specification when accepting JTIDS initialization data loads. The JTD shall not be required to perform validity checks of this data. The JTD shall store the JTIDS initialization data received from the host and return it to the host upon request in accordance with the ICDs listed in Section 2 and Table 2 of this specification.

3.2.1.2.2.2.4 JSC JTIDS Terminal Status Emulation Function. The JTD shall supply canned JTIDS terminal status parameters in logical channel number (LCN) 3 for Army terminals and terminal output message (TOM) 1 for all other terminal types. This shall be in accordance with the JTIDS ICDs listed in Section 2 and Table 2 of this specification. The JTD shall allow the operator to selectively edit status and feedback data fields (including loopback status) of TOM 1 or LCN 3.

3.2.1.2.2.2.5 JSC Message Transfer and Processing Function. The JTD shall transfer to the host platform simulated transmit scenario and/or manually generated message traffic in accordance with the ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall accept message traffic from the host system in accordance with the ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall process a combination of JTD generated and host generated message data at a maximum rate equivalent to sixty-four (64) packed 4 TADIL J messages (i.e., twelve [12] TADIL J words) per second and the maximum message rate for the other

JTIDS Test Device (JTD)

TADIL A

TADIL B

TADIL C

JTIDS Interface Cable(s)

COMM

Host Platform Central Computer

Other TADIL Devices
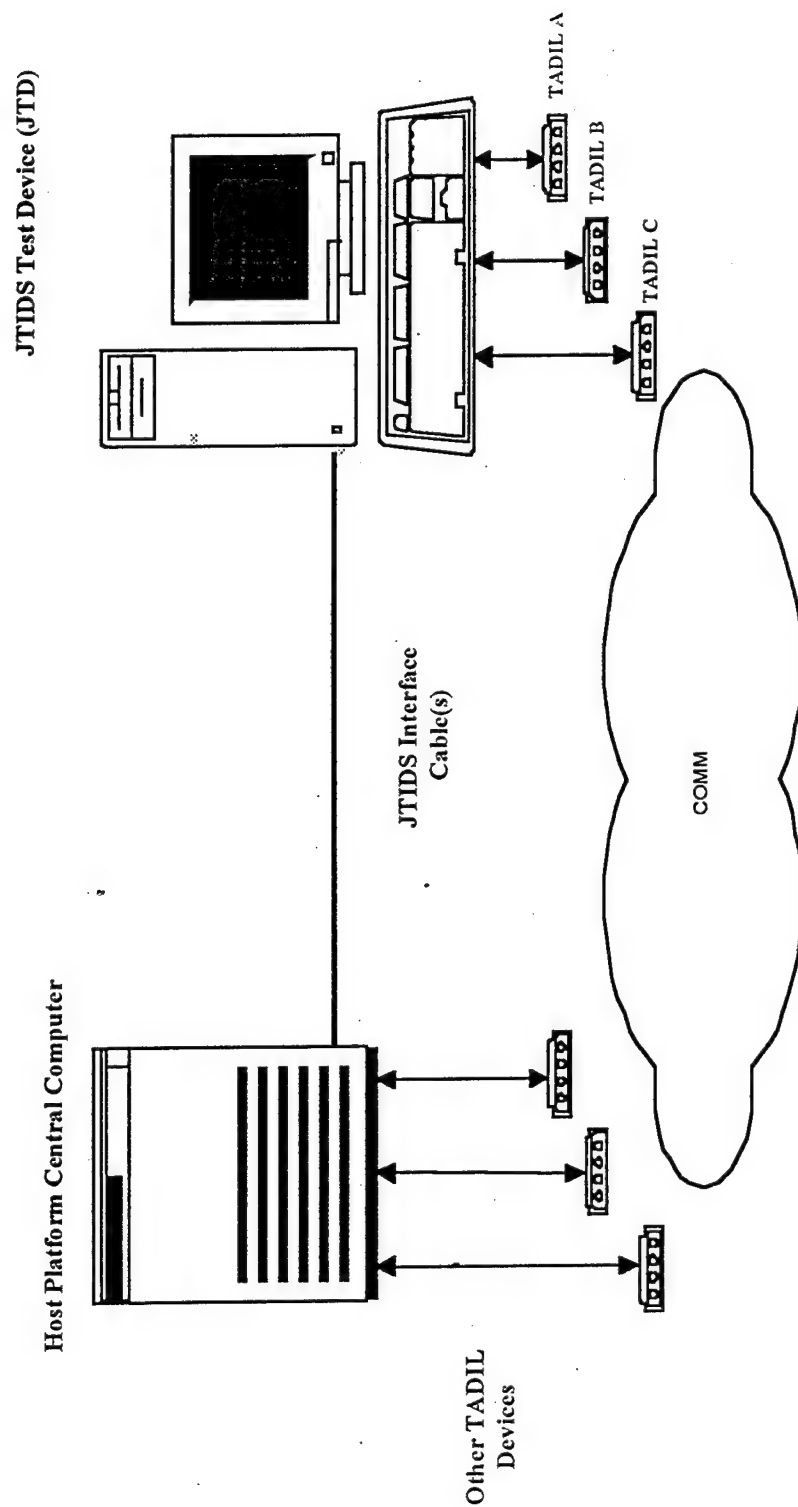
Figure 2. JTIDS Surrogate Configuration

TADILs identified in paragraphs 3.2.1.1.2 through 3.2.1.1.4 of this specification with no data lost.

3.2.1.2.2.2.6 JSC Display Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.6 through 3.2.1.2.2.1.6.2.4 and 3.2.1.2.2.1.6.2.6 of this specification.

3.2.1.2.2.2.7 JSC Printing Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.7 through 3.2.1.2.2.1.7.5 of this specification.

3.2.1.2.2.2.8 JSC Message Receipt/Compliance Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraph 3.2.1.2.2.1.8 of this specification.

3.2.1.2.2.2.9 JSC Data Recording Function. When operating in the JSC, the JTD shall meet the requirements for this function as specified in paragraph 3.2.1.2.2.1.9 of this specification.

3.2.1.2.2.3 JTIDS Interface Monitor Configuration (JIMC). In this mode, the JTD shall provide a capability to monitor message traffic on the data port interface between a JTIDS terminal and its associated host. Figure 3 depicts this mode. In this mode, the JTD shall connect to the normal host to terminal data interface port(s) in accordance with the appropriate Interface Control Document (ICD) as listed in Section 2 and Table 2 of this specification. When operating in this mode, the JTD shall be capable of the following.

3.2.1.2.2.3.1 JIMC Message Transfer and Processing Function. The JTD shall accept JTIDS terminal to host message traffic paragraphs in accordance with the ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall accept JTIDS terminal from host message traffic in accordance with the ICDs and Military Standards listed in Section 2 and Table 2 of this specification. The JTD shall process live message data at a maximum rate equivalent to sixty-four (64) packed 4 TADIL J messages (i.e., twelve [12] TADIL J words) per second and the maximum message rate for the other TADILs identified in paragraphs 3.2.1.1.2 through 3.2.1.1.4 of this specification with no data lost.

3.2.1.2.2.3.2 JIMC Display Function. When operating in the JIMC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.6 through 3.2.1.2.2.1.6.2.3 of this specification.

3.2.1.2.2.3.3 JIMC Printing Function. When operating in the JIMC, the JTD shall meet the requirements for this function as specified in paragraphs 3.2.1.2.2.1.7 through 3.2.1.2.2.1.7.4 of this specification.

Host Platform Central Computer

Other TADIL Devices

Other TADIL Devices

COMM

TADIL A

TADIL B

TADIL C

Host Platform Central Computer

JTIDS Test Device (JTD)

JTIDS Terminal

JTIDS Terminal
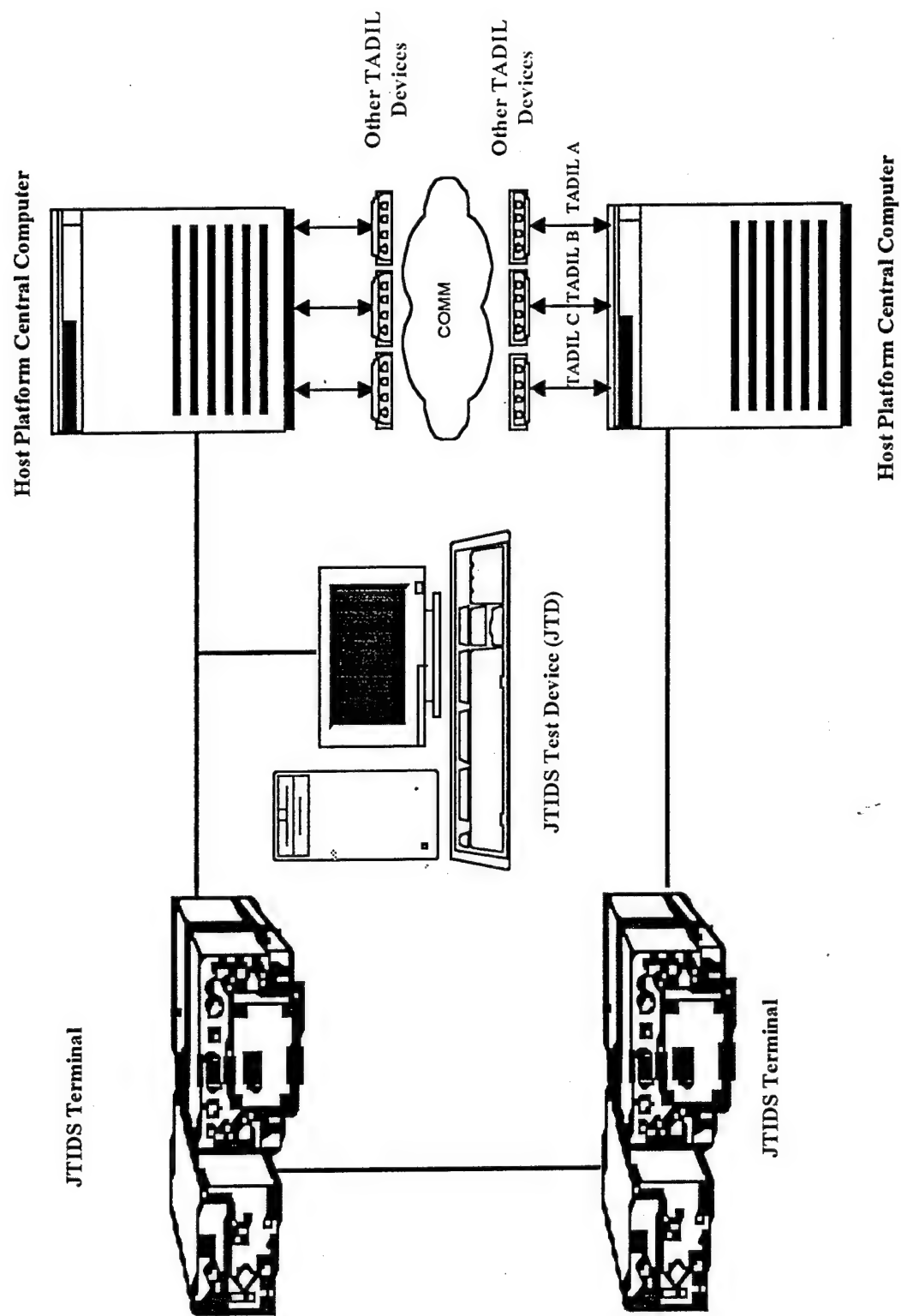
Figure 3. JTIDS Interface Monitor Configuration

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3.2.1.2.2.3.4 JIMC Data Recording Function. When operating in the JIMC, the JTD shall meet the requirements for this function as specified in paragraph 3.2.1.2.2.1.9 of this specification.

3.2.1.2.3 Post Test Analysis Mode. The JTD shall provide the capability to manipulate data recorded in DERG format for analysis. The JTD shall manipulate recorded data by operator selected options and output in a readable format to include provision for chronological listing and summary to a printer, the display, and/or mass storage devices. This function shall include, as a minimum, the capability to manipulate data, generate statistical summaries or counts, playback recorded data, print, and convert recorded data formats. These capabilities shall not require connection to any devices external to the JTD (e.g., TADIL devices, host tactical data system, etc.).

3.2.1.2.3.1 Data Analysis Function. The JTD shall have the capability to retrieve recorded data from mass storage, to filter the data, to save the data, and to print the data. Manipulation of recorded data shall be performed subsequent to test execution and shall provide analysts with extensive freedom to access various subsets of data. The operator selection options shall include, as a minimum, those listed below.

3.2.1.2.3.1.1 Data Analysis Filtering. Upon operator selection, the JTD shall provide the capability to filter data by TADIL, live/simulated, message type, source track number, identity, track number, time interval, terminal status message statistic, and/or terminal ongoing status parameter. Upon operator selection, the filters shall operate as either pass through or rejection. The operator shall be capable of specifying up to 12 data analysis filters separately or in combination prior to post test analysis or at any time during the post test analysis.

3.2.1.2.3.1.2 Data Analysis Storage. Upon operator selection, the JTD shall provide the capability to store filtered data in files.

3.2.1.2.3.2 Playback of Recorded Data Function. The JTD shall provide the capability to playback data recorded in accordance with paragraph 3.2.1.2.2.1.9 of this specification so that the recorded data can be displayed, printed and transmitted over the appropriate TADIL device.

3.2.1.2.3.2.1 Playback Speeds. The JTD shall, as a minimum, playback recorded data at rates including one half (1/2), one (1), and five (5) times the real execution time. The playback rate shall be selectable by the operator.

3.2.1.2.3.2.2 Playback Controls. The JTD shall implement operator controls to allow forward, reverse, stop, fast forward, fast rewind, and restart of the recorded data. The JTD shall also allow the operator to go to a specific time on the recorded data.

3.2.1.2.3.3 TADIL J Recorded Data Conversion Function. N/A.

3.2.1.2.3.4 Analysis Print Function. Upon operator selection, the JTD shall provide the capability to print data recorded during test execution in its entirety or subject to filtering. The printouts shall include, as a minimum, identification of field headings, title, date, and security classification. The printout shall list any data analysis filtering employed. The format of the data analysis printouts shall conform to the requirements in paragraphs 3.2.1.2.2.1.7.1 through 3.2.1.2.2.1.7.3 of this specification.

3.2.1.2.3.4.1 Analysis Print Filters. Upon operator selection, the JTD shall provide for filtering of messages for printing. Upon operator selection, the filters shall operate as either pass through or rejection. Print filtering in the full message format shall include the capability for the operator to specify up to twelve (12) filter settings separately or in combination prior to execution or at any time during the execution of the scenario to enable printing of selected messages. As a minimum, the JTD shall provide the operator with the capability to specify filters to include TADIL source, live/simulated, message type, source track number, identity, track number, transmit/receive and time interval.

3.2.1.3 Maintenance State. The JTD shall support JTD hardware maintenance and TADIL hardware modes. The JTD shall allow the user to select these modes and perform their functions without the need for restarting and/or rebooting.

3.2.1.3.1 JTD Hardware Maintenance Mode. The JTD shall provide the capability to perform hardware diagnostics without connection to any TADIL related device or host platform, but the capability shall not preclude either connection. The JTD shall use NDI utilities to the maximum extent possible to monitor the performance and report the status of processors, peripheral equipment, interface equipment and communication devices. The JTD shall alert the user to the occurrence of faults, errors, and malfunctions. The JTD shall provide a descriptive message detailing the faults, errors, and malfunctions found and provide identification of which major component is affected by hardware related faults, errors, and malfunctions. The JTD shall also indicate which computer programmable read-only memory (PROM) is affected for firmware related faults, errors, and malfunctions.

3.2.1.3.2 TADIL Hardware Mode. The JTD shall provide the functions required to perform testing on the various TADIL devices connected to the JTD.

3.2.1.3.2.1 JTIDS Terminal Function. The JTD shall provide the capability to command line replaceable unit (LRU) or shop replaceable unit (SRU) built-in test (BIT), as available in the terminal in use, to be executed in the JTIDS terminal and to display the results (connection to the terminal is obviously required). After performing LRU and/or SRU BIT, the JTD shall allow the display of Status Block 8, Words 14 (LRU/WRA BIT and Status Summary Word) and 15 (SRU/SRA BIT Summary Word) in hexadecimal format.

3.2.1.3.2.2 Other TADIL Equipment Function. The JTD shall provide the operator the capability to send test messages as specified in paragraph 5.1.6.4 of MIL-STD-188-203-1A for TADIL A. The JTD shall provide the operator with the capability to send test messages over the interfaces required for TADILs B and C. The JTD shall support an internal loopback capability to ensure the integrity of each TADIL link.

3.2.2 System Capability Relationships

3.2.3 External Interface Requirements

This paragraph identifies the required external interfaces of the JTD. The external interfaces shall provide, as a minimum, connection to the following interfaces.

3.2.3.1 Data Link Interfaces

The JTD shall provide the following data link interfaces.

3.2.3.1.1 TADIL J/Link 16 Interface. The JTD shall include all JTIDS interface equipment to receive/transmit and code/decode TADIL J messages and to interface with one JTIDS terminal or host at a time. The JTD shall support the ICD protocols for the TADIL J interface as listed in Section 2 and Table 2 of this specification. This interface shall allow connection to either a JTIDS Class 2/2H/2M terminal or host platform in compliance with ICDs in Table 2 of this specification.

3.2.3.1.2 TADIL A/Link 11A Interface. The JTD shall interface with one TADIL A (Link 11A) data link operating at one thousand three hundred sixty-four(1364) bps and two thousand two hundred fifty (2250) bps. This interface shall comply with the requirements of MIL-STD-188-203-1A and MIL-STD-188-114A. The JTD shall include all TADIL A interface equipment to receive/transmit and code/decode TADIL A data link information and shall allow connection to one data terminal set and/or one TSEC/KG 40 cryptographic device.

3.2.3.1.3 TADIL B/Link 11B Interface. The JTD shall interface with up to five TADIL B (Link 11B) data links, each operating at one thousand two hundred (1200) bps or two thousand four hundred (2400) bps. This interface shall comply with the requirements of MIL-STD-188-203-2 and MIL-STD-188-114A. The JTD shall include all TADIL B interface equipment to receive/transmit, automatically resynchronize cryptographic equipment, and code/decode TADIL B data link information and shall allow connections to peripheral modems and/or TSEC/KG-84 cryptographic device(s).

3.2.3.1.4 TADIL C/Link 4A Interface. The JTD shall interface with one TADIL C data link operating at five thousand (5000) bps. This interface shall comply with the requirements of MIL-STD-188-203-3, OPSPEC 404.1 (Link 4A Operational Specification), and MIL-STD-188-114A. The JTD shall include TADIL C interface equipment to

receive/transmit and code/decode TADIL C data link information and shall allow connection to one data terminal set.

3.2.3.2 Source Power Interface

3.2.3.2.1 JTD Commercial Power. The JTD shall be capable of connecting to and interfacing with one hundred ten/two hundred twenty (110/220) VAC (±10%), fifty/sixty (50/60) hertz standard commercial power. The JTD equipment shall provide any required power panels and receptacles.

3.2.3.2.2 JTIDS Terminal Power. The JTIDS Class 2 terminals shall operate from a three-phase, one hundred fifteen (115) VAC, sixty (60) Hertz electrical power source. The Government will furnish a power converter to supply 28 VDC for the Class 2M JTIDS terminal.

3.2.3.3 External Time Reference Interface

The JTD shall provide an interface between a contractor provided GPS receiver and the JTIDS terminal for the purpose of synchronizing the JTIDS terminal. Interface to the terminal shall be in accordance with the ICDs listed in Table 2 of this specification.

3.2.3.4 Ground Interface

The JTD shall provide equipment grounding that adheres to best commercial practices.

3.2.4 Physical Characteristics

The JTD hardware and software shall be a NDI to the maximum extent possible. All modifications must be approved by the Government. The JTD shall conform to the physical characteristic standards identified in the following.

3.2.4.1 Weight Limits

The weight of the largest individual replacement unit for the JTD shall not exceed a one-man lift limit (40 lbs).

3.2.4.2 Dimensions

The JTD shall consist of rack mountable modules that fit into 19 inch racks.

3.2.4.3 Access

The JTD shall provide convenient access to operational controls in accordance with best commercial practices. Rear door access shall be provided for cabling and interconnections.

3.2.4.4 Transportability and Storage

The JTD shall be capable of being transported with normal care and handling and without mechanical or structural damage or operational degradation.

3.2.4.5 Durability Factors

The keyboard(s) and other high usage items shall be resistant to failure and/or damage due to high use and the type of inadvertent abuse that can occur in this type of test tool.

3.2.4.6 Health and Safety

The JTD equipment shall not contain materials that are toxic, explosive, or which can cause adverse biological effects on the user. Also the JTD shall not emanate electromagnetic radiation that may cause adverse effects to the user.

3.2.5 System Quality Factors

3.2.5.1 Reliability

The JTD shall maintain a reliability of at least two thousand five hundred (2500) hours mean time between system failures (MTBF) (Q_0) as defined below. A system failure shall be defined as the inability to meet the JTD system requirements.

3.2.5.2 Maintainability

3.2.5.2.1 Maintainability Design Requirements. The JTD shall, as a minimum, adhere to the following design requirements in accordance with best commercial practices:

a. Operationally replaceable items shall be equipped with either plug-in or screw terminal connectors, and identical connectors shall be keyed (e.g., color coded) to avoid inadvertent erroneous connection of cables during maintenance activities.

b. Adhesive sealants shall not be used where disassembly is required for servicing or repair.

c. Self test capabilities shall be used as a means to detect faults, exercise the equipment during troubleshooting, and verify proper performance.

d. Automatic fault detectors and indicators (e.g., alarm lights, audio alerting devices) shall be employed where practical.

e. Preventive maintenance, if required, shall be required only at the deployment location of the JTD.

f. The JTD shall employ modular packaging techniques to the maximum extent possible.

g. Design of hardware components, boards, and/or configuring of NDI components in racks shall be documented in drawings in accordance with best commercial practices.

3.2.5.2.2 Maintenance Complexity. The JTD hardware design shall be consistent with the two-level maintenance approach specified in paragraph 3.5.1 of this specification.

3.2.5.2.3 Repair Times. The JTD shall have a mean time to repair (MTTR) of no greater than sixty (60) hours. MTTR begins at the time the system fails, as defined in paragraph 3.2.5.1, and ends when the system is repaired and returned to full operational condition (meets all JTD system requirements). The JTD shall have an on-site MTTR of no greater than eight (8) hours ninety-nine percent (99%) of the time. Repair times shall be within the range to permit JTD conformance to the availability percentage defined in paragraph 3.2.5.3 of this specification.

3.2.5.2.4 Maintenance Requirements. Field and depot maintenance shall be the responsibility of and accomplished by the Contractor. The JTD design shall aid fault isolation of the failed LRUs. The Contractor shall establish a central depot maintenance facility for replacement and refurbishment of the JTD if it is not repairable in the field.

3.2.5.3 Availability

The JTD system shall meet an availability of ninety-eight percent (98%). Availability is defined as MTBF divided by the sum of MTBF plus MTTR.

3.2.6 Environmental Conditions

The JTD equipment shall be capable of satisfactory operation within the performance limits specified below.

3.2.6.1 Environmental Operational Range

The JTD shall be designed to operate in a laboratory environment. All JTD equipment shall operate in the following temperature, humidity, and altitude range.

3.2.6.1.1 Operational Temperature. The JTD shall be capable of operating in a temperature range from $10^{\circ}C$ through $28^{\circ}C$.

3.2.6.1.2 Operational Humidity. The JTD shall be capable of operating in a humidity range of up to eighty percent (80%) relative humidity non-condensing.

3.2.6.1.3 Operational Altitude. The JTD shall be capable of operating in an altitude range from 100 ft below mean sea level (BMSL) to 6,000 feet above mean sea level (AMSL).

3.2.6.2 Air Conditioning and Cooling Requirements

The JTD shall provide all cooling required for itself and a JTIDS terminal.

3.2.6.3 Lighting

N/A.

3.2.7 Transportability

The JTD equipment shall be capable of being transported safely by commercial air cargo or common carrier. The JTD user console(s) shall be movable within the facility where the JTD is located.

3.2.8 Flexibility and Expansion

The JTD shall provide flexibility in use and expansion in function and capacity. The JTD shall include functional modularity and independence that will facilitate cost-effective modification and expansion. The spare processing capacity required to accommodate growth is identified in paragraphs 3.3.10 through 3.3.10.1.1.6 of this specification.

3.2.8.1 Flexibility

The JTD shall provide flexibility in accordance with the paragraphs below, in order to maximize the utility of the test tool and the capabilities listed below.

3.2.8.1.1 Degraded Mode Flexibility. The JTD shall be capable of operating with less than a full complement of equipment. Such a degraded mode will permit operation of the JTD in the operational or maintenance modes.

3.2.8.1.2 Flexibility for Software. The JTD shall employ commercial-off-the-shelf (COTS) software packages (e.g., operating systems, DBMS, computer aided software design tools, etc.) which can be used in the development of future modifications and enhancements.

3.2.8.2 Expandability

The JTD shall be expandable with a minimum impact to cost and system design. The aspects of expandability shall address both the modification and addition of functional capabilities and increased capacities.

3.2.8.2.1 Expandability of Capacities. The JTD shall be designed to allow system capacities to be modifiable by the change of a parametric value and/or, if required, the addition of hardware.

3.2.8.2.2 Expandability for Options. The JTD shall be designed to incorporate optional changes including the use of new TADILs, ICDs, messages, and user consoles.

3.2.9 Portability

The JTD software shall be easily portable to other computing architectures with minimum impact to software integrity.

3.3 DESIGN AND CONSTRUCTION

The JTD hardware shall be COTS to the maximum extent possible. If newly developed equipment is required by the Contractor, it shall use the highest grade commercial components consistent with off-the-shelf equipment utilized in the JTD.

3.3.1 Materials, Processes, and Parts

Materials, processes and parts shall be to best commercial practices and standards.

3.3.1.1 Toxicity

In addition to voltage warnings, a toxic warning similar to the following shall be included in all documentation related to CRT console(s).

<ins>WARNING</ins>

Use caution (e.g., wear safety glasses) when handling the cathode ray tube (CRT) to avoid risk of implosion. The internal phosphor coating is toxic.

If the cathode ray tube breaks and skin or eyes are exposed to this phosphor, rinse with cold water and consult a physician.

3.3.1.2 Bonding

The JTD shall have adequate provisions for low impedance bonding of panels, chassis, and rack mounted equipment to the ground plane.

3.3.1.3 Connections

All power and signal connections to the JTD equipment shall be made at the rear of the components whenever possible. All external connectors shall be made with plug or threaded connectors. All fabricated connectors and cable assemblies shall use metal shell connectors. All identical connectors shall be keyed (e.g., color coded) to avoid inadvertent wrongful interconnection.

3.3.1.4 Corrosion Resistance

Metal parts shall possess adequate corrosion resistance characteristics or shall be suitably protected by the use of coatings to resist corrosion. The use of dissimilar metals in direct contact shall be avoided where possible.

3.3.2 Electromagnetic Radiation

N/A.

3.3.2.1 TEMPEST

N/A.

3.3.2.2 Compatibility

N/A.

3.3.3 Nameplates and Markings

All JTD nameplates and markings shall conform to best commercial practices.

3.3.4 Workmanship

For COTS, the JTD equipment shall be constructed to best commercial practices.

3.3.5 Interchangeability

All like assemblies, subassemblies, cable connectors, and replaceable parts shall be physically and functionally interchangeable without modification of such items or of equipment.

3.3.6 Safety

Adequate accessibility shall be available for safe servicing, inspection, maintenance, and removal/installation of all JTD components. Means shall be provided to remove power while installing, replacing, or interchanging a complete equipment assembly or a part thereof. All external surfaces and shields shall be connected to a ground potential. Equipment shall be

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designed and selected to encompass safety features that reduce or eliminate personnel hazards while not impairing efficiency or operational capabilities. COTS equipment shall comply with CFR 1910 (OSHA), Subpart S, Section 1910.339 requirements for "acceptable" equipment (determined to be safe by a nationally recognized testing agency, federal or state agency, or the manufacturer).

3.3.6.1 Circuit Breakers

The primary power panels, computer peripherals, and rack mounted assemblies/subassemblies shall include circuit breakers to remove AC power when overload conditions exist.

3.3.6.2 Markings and Warnings

The console(s) shall be clearly marked with appropriate warning labels for all hazards, especially high voltage hazards in excess of five hundred (500) volts.

a. A warning similar to that shown below shall be included in all documentation related to any CRT console(s).

WARNING

Dangerous voltages 25000 VDC and 115 VAC are present in the video display circuits and may remain present in the monitor circuits after power is removed.

USE CAUTION WHEN WORKING ON INTERNAL CIRCUITS

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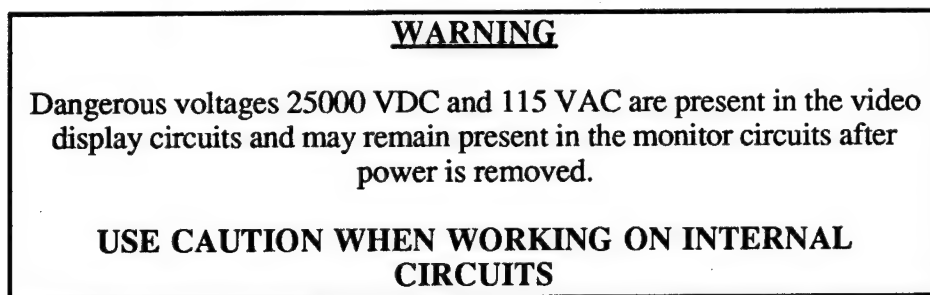
b. Operation and maintenance documentation shall include precautions, as required.

3.3.6.3 Safety Criteria

All electrical terminals having 110 VAC or greater shall be marked and covered to prevent accidental contact by maintenance personnel. All electrical terminals having 28 VDC or greater shall be marked and covered to prevent accidental contact by maintenance personnel.

3.3.6.3.1 High Voltage. All high voltage power supplies shall be covered to prevent accidental contact by maintenance personnel.

3.3.7 Human Performance/Human Engineering

The JTD shall conform to human engineering design criteria and principles of best commercial practices to achieve safe, reliable and effective performance by personnel and to minimize

personnel skill requirements and training time. The Contractor shall ensure that the controls and indicators are readily accessible and operable by personnel. These include the following:

a. Procedures, formats, and symbology.

b. Knobs, dials, switches, and control/display devices.

c. Specifications of software requirements for effective control and display utilization by JTD users.

d. Location and arrangement of equipment for effective performance.

e. Consideration of environmental factors.

f. Proficiency levels of JTD operational users and maintenance personnel.

3.3.7.1 Audio Alarms

When an audible alarm is provided, the alarm shall be of the "summary alarm" type and shall have a silence switch with an automatic reset feature. The audible alarm shall have a visual alarm indicator that is not affected by the silence switch.

3.3.7.2 Glare

The physical setup of the JTD at each location shall minimize glare on the display console(s), meters, and writing surfaces.

3.3.7.3 Acoustic Noise

The acoustic noise level of the JTD while operating shall not exceed an A-sound of 75 decibels (dB(A)) with a design goal of 65 (dB(A)).

3.3.7.4 Software

The JTD software design shall conform to best commercial practices for human performance and human engineering.

3.3.8 Nuclear Control Requirements

N/A.

3.3.9 Security

The JTD shall provide security controls to prevent compromise of classified information, unauthorized access to the system, and reasonable protection of its software and hardware against malicious actions.

3.3.9.1 Physical Access

N/A.

3.3.9.2 System Access Control

The JTD shall employ system access safeguards to prevent unauthorized entry. System access controls shall authenticate all users. Positive user account lockout shall occur if wrong authentication is used three (3) times within a five (5) minute interval. Validation of user identification shall be automatically handled by the JTD. A system administrator shall have access to set up user authentication. The JTD shall maintain a file containing, as a minimum, file access activity, user log-on errors, and other authentication error conditions.

3.3.9.3 Communication Access Control

N/A.

3.3.9.4 Equipment Erase and Purge Control Equipment

All classified data stored in volatile memory shall be destroyed upon powering down the JTD equipment. All nonvolatile memory containing classified data shall be removable for storage in a classified container.

3.3.10 Computer Resource Requirements

3.3.10.1 Configuration Item (CI) Processing Resources

3.3.10.1.1 Computer Hardware Requirements. The JTD computer hardware shall provide, as a minimum, the characteristics listed below.

3.3.10.1.1.1 Memory Capacity Requirements. The JTD shall provide a memory size that shall insure that fifty percent (50%) of the total memory is in reserve when operating at maximum JTD capacity load.

3.3.10.1.1.2 Processor Speed Requirements. The JTD shall provide a processing speed that shall insure fifty percent (50%) of the total processing capability is spare when operating at maximum JTD capacity load.

3.3.10.1.1.3 Processing Requirements. The JTD shall employ a COTS instruction set architecture as provided by the processor vendor. The JTD shall provide a COTS interrupt capability as provided by the processor vendor. The JTD shall employ a COTS direct memory access (DMA) capability as provided by the processor vendor.

3.3.10.1.1.4 Processor Communication Requirements. The JTD shall employ an interface channel that insures that fifty percent (50%) of each channel throughput capacity is in reserve when operating at maximum JTD capacity load, and fifty percent (50%) of the total number of interface channels are in reserve when operating at this load. The internal JTD communications shall be Government Open Systems Interface Profile (GOSIP) compatible.

3.3.10.1.1.5 Auxiliary Storage Requirements. The JTD shall provide an auxiliary storage capacity that insures that fifty percent (50%) of the total auxiliary storage memory is in reserve when operating at maximum JTD capacity load.

3.3.10.1.1.6 Growth Requirements. The JTD shall provide a capacity that insures the ability to handle hundred percent (100%) growth.

3.3.10.1.2. Self Test and Fault Isolation. The JTD shall provide self test and fault isolation capabilities. The fault isolation and detection procedures shall result in detection of ninety-five percent (95%) and isolation of ninety percent (90%) of all faults detected to a primary replaceable unit within the JTD. Primary replaceable units shall include individual components of computer(s) (e.g., CPU, main memory, I/O processors, I/O controllers, peripherals, and multiplexers) and communications equipment.

3.3.10.1.3 Performance Monitoring. The JTD shall have a basic set of capabilities to support/augment the operations identified above. This should include a BIT function that provides monitoring of JTD performance at regular intervals (e.g., once per second).

3.3.10.2 Programming Requirements

The programming language and design language shall be a higher order language. The JTD software shall comply with Portable Operating System Interface (Unix) (POSIX) requirements as defined in Section 2 of this JTD Requirements Specification. Use, extension and modification of nondevelopment programs can be accomplished in their original language. Assembly language may be utilized in the implementation of time-critical modules, device handlers, and existing code.

3.3.10.2.1 Compiler/Assembler. The compiler(s) and assembler(s) used to produce the JTD computer programs shall be commercially available, nondevelopmental and mature/demonstrated products. The compiler(s)/assembler(s) shall be maintained at the most current versions.

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3.3.10.2.2 Operating System. The JTD shall utilize a commercial vendor supplied, nondevelopmental operating system(s) (OS) package. This OS shall be POSIX compatible. OS augmentation shall be allowed, but no augmentation shall be embedded within the vendor supplied OS software; a separate interface shall be provided. The OS(s) shall be maintained at the most current versions.

3.3.10.2.3 Database Management System/File Management System. The JTD shall employ a general purpose COTS DBMS/FMS that shall operate under the control of the OS and shall have the capability to process logical subsets of data in both an interactive and an automated mode. The DBMS/FMS shall have the capability to handle data interchange among storage devices delivered with the JTD.

3.3.10.2.4 Communications Software. The JTD shall employ transmission control protocol/internet protocol (TCP/IP) standard communication protocols for any intercomputer communications. The communications software shall provide a network capability allowing transparent application to application software interface within the network.

3.3.10.2.5 Graphics User Interface Environment. The JTD shall operate under a POSIX compatible graphics user interface (GUI) (e.g., MOTIF, X-WINDOWS, etc.) environment. This environment shall allow multiple applications software to run concurrently allowing user interaction with and visual indication of active applications.

3.3.10.3 Design and Coding Constraints

Industry accepted coding standards and practices shall be used in development of the JTD computer programs.

3.3.10.3.1 Coding Standards. JTD design and coding standards shall comply with DOD-STD 2167A. NDI software shall not be modified to conform to these requirements.

3.3.10.3.2 Structured Programming. The JTD software shall employ structured programming techniques. The programming standards and implementation conventions used for the JTD software shall conform to the requirements of Appendix B of DOD-STD-2167A.

3.3.10.3.3 Top-Down Modular Design. The JTD programs shall be logically designed using hierarchical levels. The levels of hierarchy shall correspond to levels of control of tasks performed by the programs. The top level shall contain the highest level of control logic within the code hierarchy. Each sub level shall consist of self-contained code components whose operations are subordinate to the code components in the next higher level. The essential characteristics of the top-down modular design shall be that, at each level of functional decomposition, the code shall be complete in itself. Some code may appear on more than one level in order to retain logical completeness at each level.

3.3.10.3.4 Top-Down Implementation. The software shall be implemented in a top-down manner. Conceptually, this implementation shall proceed from a single starting point within an existing functional capability. The single starting point does not imply that the implementation must proceed down the hierarchy in parallel.

3.3.10.3.5 Commenting. The JTD programs shall contain sufficient on-line documentation so that the observer shall be able to read the program header and each successive sub task header and understand the processing activities of the program without having to read program code. The header shall be a set of consecutive comments that contain a descriptive abstract of the program or sub task, engineering change proposals, and software problem reports by number. The header shall occur once in a program or sub task listing and appear immediately before the first executable statement.

3.3.10.3.6 Microprogramming. All JTD microprogramming shall comply with the requirements for computer programs and documentation of computer programs within this specification.

3.3.10.3.7 Firmware. JTD programs that are loaded in a class of memory (e.g., read-only memory (ROM) and programmable read-only memory (PROM)) that cannot be dynamically modified by the computer during processing, shall be considered firmware. All firmware acquired for the JTD shall be developed and documented to the same level as specified for the software.

3.3.10.3.8 Support Software. All support computer programs needed to load, initialize and maintain JTD operation shall be provided and shall be executable on the JTD.

3.3.10.4 Computer Processor Utilization

3.3.10.4.1 Resource Monitoring. N/A.

3.3.10.4.2 Operational Mode Software Timing Diagnostics. N/A.

3.3.10.4.3 Equipment Monitoring and Diagnostics. The JTD shall perform both operational mode performance monitoring and fault detection, and provide maintenance mode diagnostics for fault isolation. The JTD shall monitor the performance of, and report on the status of, computing, display, and communications equipment to alert the user to the occurrence of faults, errors, and malfunctions.

3.4 DOCUMENTATION

This paragraph is not applicable to this specification.

3.5 LOGISTICS

The Contractor shall be responsible for the logistical support of the JTD.

3.5.1 Support Concept

The JTD maintenance activities shall include the definition and employment of a preventive and corrective maintenance program compatible with the maintainability requirements and approaches of this specification. The JTD shall be designed to support field and depot level maintenance. The hardware and software maintenance concept shall be contractor field maintenance and contractor depot level maintenance. The Contractor shall maintain the necessary equipment (e.g., test equipment, spares, etc.) and software (e.g., diagnostics) to provide JTD support. At the field level of maintenance, the JTD shall not require the use of support equipment.

3.5.1.1 Field Level Maintenance

Field level maintenance consists of those on-equipment tasks normally performed using resources at the operating location. Troubleshooting at the field level shall be accomplished using fault diagnostics and/or built-in-test supplied with or provided for the JTD. Items replaced at the field level shall be returned to the Contractor depot level maintenance center for repair and/or disposition.

3.5.1.2 Depot Level Maintenance

The Contractor shall maintain a facility for maintenance beyond the capabilities of the field-level. Maintenance of equipment beyond the capability of the Contractor shall be referred to the service facilities of the equipment manufacturer and/or an equivalent service facility to include the Contractor's facility.

3.5.2 Support Facilities

3.5.2.1 Hardware Support

Unless otherwise specified, the Contractor shall secure and maintain COTS agreements and site licenses as required through the Government. The Contractor shall ensure that all COTS maintenance agreements are transferable to the Government.

3.5.2.2 Software Support

Unless otherwise specified, the Contractor shall secure and maintain COTS agreements and site licenses as required through the Government. The Contractor shall ensure that all COTS maintenance agreements are transferable to the Government. The Contractor shall be responsible for the support of the JTD software.

3.5.2.3 Software Program Maintenance/Development Configuration

The Contractor shall identify the hardware and software configuration for the JTD program. The JTD software shall be supported on the same equipment as that fielded.

3.5.3 Supply

The Contractor shall be responsible to ensure that supplies and spare parts will be provisioned and time-phased to be procured in adequate quantities to provide full support of preventive and corrective maintenance activities.

3.6 PERSONNEL AND TRAINING

3.6.1 Personnel

The Contractor shall provide personnel with the appropriate skills to operate and maintain the JTD.

3.6.2 Training

The JTD shall maximize use of on-line help to train the user. The Contractor shall offer the following types of courses to the Government, available upon request, which shall provide structured training to the JTD user community.

3.6.2.1 System User Training

The Contractor shall provide System User Training to include comprehensive hands-on operational use of the JTD. Topics to be addressed, as a minimum, include detailed instruction on system setup and initialization, activities in the Pre-Test Preparation (e.g., scenario generation), Test Execution (e.g., on-line message generation), Post Test Analysis (e.g., tape reformatting), JTD Hardware Maintenance (e.g., diagnostics) and TADIL Hardware (e.g., built-in test) modes. These sessions will be tailored for the intended operational user of the system.

3.6.2.2 Training Aids

The training specified above shall be supported through the use of technical manuals and other devices or aids. These devices and aids shall be designed and prepared in a manner that will allow individual use for self-instruction.

3.7 CHARACTERISTICS OF SUBORDINATE ELEMENTS

3.7.1. JTD Equipment

The equipment used to comprise the JTD shall be NDI to the maximum extent possible and meet best commercial design standards.

3.7.1.1 Computing Unit

The JTD shall use a multiple purpose computing unit environment as its central computing resource. The JTD will be capable of functioning on a military standard service workstation platform. The processing requirements identified in paragraphs 3.3.10 through 3.3.10.1.1.6 of this specification must be met by this computing unit.

3.7.1.2 Display Console(s)

As a minimum, the Display Console(s) shall include a processor controlled color graphics terminal with a keyboard for data entry and a pointing device for cursor control. The Display Console(s) shall have, as a minimum, resolution of 1280 by 1024 picture elements (pixels), and a 19-inch diagonal screen. The display shall provide a video RGB output that shall allow the display to be output to a large screen display system. The display shall be capable of a minimum of 16 colors. The JTD shall be provided with two (2) display consoles and shall be capable of operating with up to a minimum of two additional display consoles. Individual display consoles shall be capable of performing any or all of the functions specified in paragraphs 3.2.1.2.2.1.6 through 3.2.1.2.2.1.6.2.6 of this specification independently upon operator selection. Specific responsibilities and authorizations shall be assigned to each console as part of JTD initialization.

3.7.1.3 Printer(s)

The JTD shall provide one (1) or more printers. The printer(s) shall provide hard copy output. It shall provide capabilities to handle standard and non-standard paper sizes. Printer(s) shall be capable of performing any or all of the functions specified within paragraphs 3.2.1.2.1.5, 3.2.1.2.2.1.7 through 3.2.1.2.2.1.7.6, and 3.2.1.2.3.4 through 3.2.1.2.3.4.1 of this specification upon operator selection.

3.7.1.4 Alphanumeric Keyboard

The Alphanumeric Keyboard shall provide for entry of the complete one hundred twenty-eight (128) character American Standard Code for Information Interchange (ASCII) set. It shall also include a cursor control pad and numeric entry pad. In addition it shall support a minimum of 12 programmable function keys to be used for commonly performed actions.

3.7.1.5 Pointing Device

The pointing device shall provide the control of a graphics cursor. It shall support all of the requirements listed in 3.2.1.2.1.1, 3.2.1.2.1.1.1.1.1 through 3.2.1.2.1.1.1.1.1.1.2, 3.2.1.2.2.1.6 through 3.2.1.2.2.1.6.2.6, and 3.7.1.2 of this specification.

3.7.1.6 Data Storage Devices

There shall be provisions for storage of data on the items listed below. Data transfer between data storage devices shall be provided.

3.7.1.6.1 Magnetic Tape Unit(s). Any magnetic tape units used shall be front loading and rack mountable. They shall support nine (9) track tapes up to a density of six thousand two hundred fifty (6250) BPI.

3.7.1.6.2 Mass Storage Unit(s). The JTD shall contain a high capacity removable mass storage device capable of storing at least 200 MB of data.

3.7.1.6.3 Floppy Diskette Unit. The JTD shall support use of a three and one half (3.5) inch (1.44 MB) floppy disk unit.

3.7.1.6.4 CD-ROM Unit(s). The JTD shall support use of CD-ROM technology and unit(s).

3.7.1.7 Cables

The JTD hardware complement shall contain all cables and assemblies required to interface the JTD to all TADIL devices or all host platforms required to operate in the JTIDS Surrogate Configuration, in the Host Surrogate Configuration, or in the JTIDS Interface Monitor Configuration.

3.7.1.8 GPS Receiver

The JTD hardware complement shall include a COTS GPS receiver.

3.8 PRECEDENCE

This paragraph is not applicable to this specification.

SECTION 4

QUALITY ASSURANCE PROVISIONS

4.1 GENERAL

This section establishes the requirements and criteria for verification of the JTD performance characteristics identified in Section 3 of this specification.

4.1.1 Philosophy of Testing

The basic objective of the verifications described within this specification is to determine if the requirements contained in Section 3 (and all subparagraphs thereof) of this specification have been met. Each of these requirements shall be verified. The testing approach to each requirement of this document shall be as specified in the Verification Cross Reference Matrix contained within this document. All requirements whether implemented within hardware, firmware, or software shall be verified using hardware that is identical to the JTD operational system hardware.

4.1.2 Location of Testing

Formal Qualification Testing (FQT) and Acceptance Testing (AT) shall be conducted to verify conformance with the requirements of this specification in accordance with the matrix of paragraph 4.3 and the SOW.

4.1.3 Responsibility for Tests

The Contractor shall be responsible for conducting testing as specified in the applicable contract. The Contractor shall be responsible for all verification.

4.1.4 Qualification Methods

The methods used to qualify the system shall be as follows.

4.1.4.1 Inspection

Testing by visual examination of the item, reviewing descriptive documentation, and comparing the appropriate characteristics with a predetermined standard to determine conformance to requirements without the use of special laboratory equipment or procedures.

4.1.4.2 Analysis

Testing by technical or mathematical evaluation using mathematical representations (i.e., math models, algorithms, equations), charts, graphs, circuit diagrams, and representative data or evaluation of previously qualified equipment.

4.1.4.3 Demonstration

Testing by operation, movement, and/or adjustment of the item in performing its design functions under a specific set of conditions without recording of quantitative data except check sheets. The item may be instrumented and quantitative limits of performance monitored, but actual data are not required to be recorded.

4.1.4.4 Test

Testing through systematic exercising of the item with instrumentation and collection, analysis, and evaluation of quantitative data.

4.2 SPECIAL TEST AND EXAMINATIONS

Special Test and Examinations shall include Installation and Checkout Testing and Regression Testing.

4.2.1 Installation and Checkout Testing

The Contractor shall be responsible for performing installation and checkout of the JTD upon arrival at the operating location. The Contractor's responsibilities shall include, as a minimum, inspection for damage caused during shipment, damage caused during installation, correct installation of equipment, and a demonstration of the operation of the JTD in all states and modes in accordance with a subset of the Government approved FQT Test Plan and Procedures. The Contractor shall submit the subset for Government approval.

4.2.2 Regression Testing

The Contractor shall plan, document, and conduct appropriate testing of any change or modification made to the JTD baseline and/or a software version release/build. This testing shall include full testing of the modification and full testing of the interaction of the modification with the baseline JTD in accordance with the Government approved Test Plan and Procedures. Modification, additions, and deletions of the Government approved Test Plan and Procedures shall be permitted upon Government approval.

4.3 VERIFICATION CROSS REFERENCE MATRIX

The following lists the qualification requirements and specifies the method of testing that shall be used for the JTD.

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.1	Definition	N/A	N/A	N/A	N/A
3.2	Characteristics	N/A	N/A	N/A	N/A
3.2.1	Performance Characteristics	N/A	N/A	N/A	N/A
3.2.1.1	Multiple TADIL Operation			X	
3.2.1.1.1	TADIL J/Link 16 Operation				X
3.2.1.1.2	TADIL A/Link 11A Operation				X
3.2.1.1.3	TADIL B/Link 11B Operation				X
3.2.1.1.4	TADIL C/Link 4A Operation				X
3.2.1.1.5	TADIL Message Catalogues				X
3.2.1.2	Operational State			X	
3.2.1.2.1	Pre-Test Preparation Mode			X	
3.2.1.2.1.1	Scenario Generation Function				X
3.2.1.2.1.1.1	Message Generation				X
3.2.1.2.1.1.1.1	Recurrent Scenario Element Messages				X
3.2.1.2.1.1.1.1.1	Element Change Events				X
3.2.1.2.1.1.1.1.1.1	Trajectory Generation				X
3.2.1.2.1.1.1.1.1.1.1	Waypoints				X
3.2.1.2.1.1.1.1.1.1.2	Special Trajectories				X
3.2.1.2.1.1.1.1.2	Non-Recurrent and Recurrent (Non-position) Messages				X
3.2.1.2.1.1.1.3	Scenario Summaries				X
3.2.1.2.1.1.1.4	Scenario Files				X
3.2.1.2.1.1.1.5	Message Rates				X
3.2.1.2.1.1.1.6	Scenario Special Test Message				X
3.2.1.2.1.2	Scenario Preview Function			X	
3.2.1.2.1.2.1	Preview Speeds			X	
3.2.1.2.1.2.2	Preview Controls			X	
3.2.1.2.1.2.3	Plotted Trajectory Preview				X
3.2.1.2.1.3	Background Map Generation Function				X
3.2.1.2.1.3.1	Map Capacity				X
3.2.1.2.1.3.2	Map Overlays				X
3.2.1.2.1.4	TADIL Initialization Function				X
3.2.1.2.1.4.1	JTIDS Terminal Initialization Load Generation				X
3.2.1.2.1.4.2	TADIL A/Link 11A Initialization				X

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.2.1.2.1.4.3	TADIL B/Link 11B Initialization				X
3.2.1.2.1.4.4	TADIL C/Link 4A Initialization				X
3.2.1.2.1.5	Pre-Test Print Function				X
3.2.1.2.2	Test Execution Mode			X	
3.2.1.2.2.1	Host Surrogate Configuration (HSC)				X
3.2.1.2.2.1.1	HSC TADIL Initialization Function				X
3.2.1.2.2.1.2	HSC On-Line TADIL Initialization Change Function				X
3.2.1.2.2.1.3	HSC On-Line TADIL Message Generation Function				X
3.2.1.2.2.1.3.1	Generation and Processing				X
3.2.1.2.2.1.3.2	On-Line Non-Recurrent Messages				X
3.2.1.2.2.1.3.3	On-Line Recurrent Element Messages				X
3.2.1.2.2.1.3.4	Special Test Messages				X
3.2.1.2.2.1.3.5	Prescripted Messages				X
3.2.1.2.2.1.4	HSC Scenario Execution Function				X
3.2.1.2.2.1.4.1	Scenario Execution Control				X
3.2.1.2.2.1.4.1.1	Redirecting Elements				X
3.2.1.2.2.1.4.2	Execution Timing				X
3.2.1.2.2.1.4.3	Scenario Filters				X
3.2.1.2.2.1.5	HSC Message Transfer and Processing Function				X
3.2.1.2.2.1.6	HSC Display Function			X	
3.2.1.2.2.1.6.1	Situation Display Subfunction			X	
3.2.1.2.2.1.6.1.1	Scaling			X	
3.2.1.2.2.1.6.1.2	Cursor Control			X	
3.2.1.2.2.1.6.1.3	Track/Point Elements			X	
3.2.1.2.2.1.6.1.4	Message Originated Lines and Areas			X	
3.2.1.2.2.1.6.1.5	Display Information			X	
3.2.1.2.2.1.6.1.6	Track Data Blocks			X	
3.2.1.2.2.1.6.1.7	Stale Element Removal			X	
3.2.1.2.2.1.6.1.8	Display Filters			X	
3.2.1.2.2.1.6.1.9	Hooking			X	
3.2.1.2.2.1.6.1.10	Display Controls			X	
3.2.1.2.2.1.6.2	Text Display Subfunction			X	
3.2.1.2.2.1.6.2.1	Hooked Entities of Interest			X	
3.2.1.2.2.1.6.2.2	Scrolling			X	

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.2.1.2.2.1.6.2.2.1	Scrolling Filters			X	
3.2.1.2.2.1.6.2.3	Addressed Messages			X	
3.2.1.2.2.1.6.2.4	JTIDS Terminal Status Parameters			X	
3.2.1.2.2.1.6.2.5	TADIL Message Statistics			X	
3.2.1.2.2.1.6.2.6	TADIL Initialization Parameters			X	
3.2.1.2.2.1.7	HSC Printing Function			X	
3.2.1.2.2.1.7.1	Type 1 Format			X	
3.2.1.2.2.1.7.2	Type 2 Format			X	
3.2.1.2.2.1.7.3	Type 3 Format			X	
3.2.1.2.2.1.7.4	Print Filtering			X	
3.2.1.2.2.1.7.5	TADIL Initialization Data Parameters			X	
3.2.1.2.2.1.7.6	TADIL Message Statistics			X	
3.2.1.2.2.1.8	HSC Message Receipt/Compliance Function				X
3.2.1.2.2.1.9	HSC Data Recording Function				X
3.2.1.2.2.2	JTIDS Surrogate Configuration (JSC)				X
3.2.1.2.2.2.1	JSC On-Line TADIL Message Generation Function				X
3.2.1.2.2.2.2	JSC Scenario Execution Function				X
3.2.1.2.2.2.3	JSC JTIDS Terminal Initialization Emulation Function				X
3.2.1.2.2.2.4	JSC JTIDS Terminal Status Emulation Function				X
3.2.1.2.2.2.5	JSC Message Transfer and Processing Function				X
3.2.1.2.2.2.6	JSC Display Function			X	
3.2.1.2.2.2.7	JSC Printing Function			X	
3.2.1.2.2.2.8	JSC Message Receipt/Compliance Function				X
3.2.1.2.2.2.9	JSC Data Recording Function				X
3.2.1.2.2.3	JTIDS Interface Monitor Configuration (JIMC)				X
3.2.1.2.2.3.1	JIMC Message Transfer and Processing Function				X
3.2.1.2.2.3.2	JIMC Display Function			X	
3.2.1.2.2.3.3	JIMC Printing Function			X	
3.2.1.2.2.3.4	JIMC Data Recording Function				X
3.2.1.2.3	Post Test Analysis Mode				X
3.2.1.2.3.1	Data Analysis Function				X
3.2.1.2.3.1.1	Data Analysis Filtering				X
3.2.1.2.3.1.2	Data Analysis Storage				X

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.2.1.2.3.2	Playback of Recorded Data Function				X
3.2.1.2.3.2.1	Playback Speeds				X
3.2.1.2.3.2.2	Playback Controls				X
3.2.1.2.3.3	TADIL J Recorded Data Conversion Function	N/A	N/A	N/A	N/A
3.2.1.2.3.4	Analysis Print Function			X	
3.2.1.2.3.4.1	Analysis Print Filters				X
3.2.1.3	Maintenance State			X	
3.2.1.3.1	JTD Hardware Maintenance Mode			X	
3.2.1.3.2	TADIL Hardware Mode			X	
3.2.1.3.2.1	JTIDS Terminal Function			X	
3.2.1.3.2.2	Other TADIL Equipment Function			X	
3.2.2	System Capability Relationships	N/A	N/A	N/A	N/A
3.2.3	External Interface Requirements	X			
3.2.3.1	Data Link Interface			X	
3.2.3.1.1	TADIL J/Link 16 Interface				X
3.2.3.1.2	TADIL A/Link 11A Interface				X
3.2.3.1.3	TADIL B/Link 11B Interface				X
3.2.3.1.4	TADIL C/Link 4A Interface				X
3.2.3.2	Source Power Interface	N/A	N/A	N/A	N/A
3.2.3.2.1	JTD Commercial Power		X		
3.2.3.2.2	JTIDS Terminal Power		X		
3.2.3.3	External Time Reference Interface				X
3.2.3.4	Ground Interface		X		
3.2.4	Physical Characteristics		X		
3.2.4.1	Weight Limits		X		
3.2.4.2	Dimensions		X		
3.2.4.3	Access	X			
3.2.4.4	Transportability and Storage		X		
3.2.4.5	Durability Factors		X		
3.2.4.6	Health and Safety		X		
3.2.5	System Quality Factors		X		
3.2.5.1	Reliability		X		
3.2.5.2	Maintainability	N/A	N/A	N/A	N/A
3.2.5.2.1	Maintainability Design Requirements	X			
3.2.5.2.2	Maintenance Complexity		X		

Paragraph	Requirements	Method			
		Inspect	Analysis	Demo	Test
3.2.5.2.3	Repair Times		X		
3.2.5.2.4	Maintenance Requirements		X		
3.2.5.3	Availability		X		
3.2.6	Environmental Conditions		X		
3.2.6.1	Environmental Operational Range		X		
3.2.6.1.1	Operational Temperature		X		
3.2.6.1.2	Operational Humidity		X		
3.2.6.1.3	Operational Altitude		X		
3.2.6.2	Air Conditioning and Cooling Requirements		X		
3.2.6.3	Lighting	N/A	N/A	N/A	N/A
3.2.7	Transportability		X		
3.2.8	Flexibility and Expansion		X		
3.2.8.1	Flexibility		X		
3.2.8.1.1	Degraded Mode Flexibility			X	
3.2.8.1.2	Flexibility for Software		X		
3.2.8.2	Expandability		X		
3.2.8.2.1	Expandability of Capacities			X	
3.2.8.2.2	Expandability for Options			X	
3.2.9	Portability		X		
3.3	Design and Construction	X			
3.3.1	Materials, Processes, and Parts	X			
3.3.1.1	Toxicity		X		
3.3.1.2	Bonding	X			
3.3.1.3	Connections	X			
3.3.1.4	Corrosion Resistance		X		
3.3.2	Electromagnetic Radiation	N/A	N/A	N/A	N/A
3.3.2.1	TEMPEST	N/A	N/A	N/A	N/A
3.3.2.2	Compatibility	N/A	N/A	N/A	N/A
3.3.3	Nameplates and Markings	X			
3.3.4	Workmanship	X			
3.3.5	Interchangeability			X	
3.3.6	Safety	X			
3.3.6.1	Circuit Breakers			X	
3.3.6.2	Markings and Warnings	X			
3.3.6.3	Safety Criteria	X			

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.3.6.3.1	High Voltage	X			
3.3.7	Human Performance/Human Engineering	X			
3.3.7.1	Audio Alarms			X	
3.3.7.2	Glare			X	
3.3.7.3	Acoustic Noise			X	
3.3.7.4	Software	X			
3.3.8	Nuclear Control Requirements	N/A	N/A	N/A	N/A
3.3.9	Security	X			
3.3.9.1	Physical Access	N/A	N/A	N/A	N/A
3.3.9.2	System Access Control			X	
3.3.9.3	Communication Access Control	N/A	N/A	N/A	N/A
3.3.9.4	Equipment Erase and Purge Control Equipment			X	
3.3.10	Computer Resource Requirements	N/A	N/A	N/A	N/A
3.3.10.1	Configuration Item (CI) Processing Resources	N/A	N/A	N/A	N/A
3.3.10.1.1	Computer Hardware Requirements		X		
3.3.10.1.1.1	Memory Capacity Requirements		X		
3.3.10.1.1.2	Processor Speed Requirements		X		
3.3.10.1.1.3	Processing Requirements		X		
3.3.10.1.1.4	Processor Communication Requirements		X		
3.3.10.1.1.5	Auxiliary Storage Requirements		X		
3.3.10.1.1.6	Growth Requirements		X		
3.3.10.1.2	Self Test and Fault Isolation			X	
3.3.10.1.3	Performance Monitoring			X	
3.3.10.2	Programming Requirements		X		
3.3.10.2.1	Compiler/Assembler		X		
3.3.10.2.2	Operating System		X		
3.3.10.2.3	Database Management System/File Management System		X		
3.3.10.2.4	Communications Software		X		
3.3.10.2.5	Graphics User Interface Environment		X		
3.3.10.3	Design and Coding Constraints	X			
3.3.10.3.1	Coding Standards		X		
3.3.10.3.2	Structured Programming		X		
3.3.10.3.3	Top-Down Modular Design		X		
3.3.10.3.4	Top-Down Implementation		X		
3.3.10.3.5	Commenting	X			

Paragraph	Requirement	Method			
		Inspect	Analysis	Demo	Test
3.3.10.3.6	Microprogramming		X		
3.3.10.3.7	Firmware		X		
3.3.10.3.8	Support Software			X	
3.3.10.4	Computer Processor Utilization	N/A	N/A	N/A	N/A
3.3.10.4.1	Resource Monitoring	N/A	N/A	N/A	N/A
3.3.10.4.2	Operational Mode Software Timing Diagnostics	N/A	N/A	N/A	N/A
3.3.10.4.3	Equipment Monitoring and Diagnostics			X	
3.4	Documentation	N/A	N/A	N/A	N/A
3.5	Logistics		X		
3.5.1	Support Concept		X		
3.5.1.1	Field Level Maintenance		X		
3.5.1.2	Depot Level Maintenance		X		
3.5.2	Support Facilities	N/A	N/A	N/A	N/A
3.5.2.1	Hardware Support		X		
3.5.2.2	Software Support		X		
3.5.2.3	Software Program Maintenance/Development Configuration			X	
3.5.3	Supply		X		
3.6	Personnel and Training	N/A	N/A	N/A	N/A
3.6.1	Personnel		X		
3.6.2	Training		X		
3.6.2.1	System User Training		X		
3.6.2.2	Training Aids		X		
3.7	Characteristics of Subordinate Elements	N/A	N/A	N/A	N/A
3.7.1	JTD Equipment		X		
3.7.1.1	Computing Unit		X		
3.7.1.2	Display Console(s)		X		
3.7.1.3	Printer(s)		X		
3.7.1.4	Alphanumeric Keyboard		X		
3.7.1.5	Pointing Device		X		
3.7.1.6	Data Storage Devices		X		
3.7.1.6.1	Magnetic Tape Unit(s)		X		
3.7.1.6.2	Mass Storage Unit(s)		X		
3.7.1.6.3	Floppy Diskette Unit		X		
3.7.1.6.4	CD-ROM Unit(s)		X		
3.7.1.7	Cables			X	
3.7.1.8	GPS Receiver			X	

SECTION 5

PREPARATION FOR DELIVERY

Preparation for delivery shall be as specified in the contract.

SECTION 6

NOTES

6.1 INTENDED USE

6.1.1 Missions

The JTD will service a large community of users. It shall provide the user community with the capabilities to evaluate an individual host system's compliance with the message standards and appropriate host implementation documentation. It shall also aid in the verification that all systems using JTIDS terminals are interoperable and in compliance with message standards. One mission of the JTD shall be to facilitate the integration of the JTIDS terminals into host platforms by allowing contractors to perform JTIDS integration activities before the delivery of terminals and JTIDS compatibility testing prior to host systems delivery to the Government. Other missions of the JTD shall include supporting the field testing community in developmental testing and operational testing (DT/OT), supporting the operational community in the monitoring of JTIDS networks, aiding Participating Test Units (PTUs) perform intra-service/inter-service interoperability certification testing, and assisting the international testing community in international certification and interoperability efforts.

6.1.2 Threat

This section is not applicable.

6.2 JTIDS NETWORK DESIGN AID FORMAT

The following is a description of the general format of the network design loads produced by the engineering model of the JTIDS Network Design Computer Aid. The network design loads for each network will reside on one or more floppy disks produced by the computer aid operating on an IBM PC or PC compatible computers. Each floppy disk produced by the computer aid will contain a single network header file, a header file for each participant type in the network, and the individual network design loads/files for each participant in the network. The network design loads will follow the associated header file for that participant type. All files will be ASCII text files. The header files (network and participant) are primarily intended to provide bookkeeping information to the network designers. End users, like the JTD, will only need to access the network design load files for their participants of interest.

6.2.1 Physical Floppy Disk Format

The Network Design Computer Aid produces DOS formatted floppy disks. These disks are 5.25" double sided/double density, 5.25" double sided/high density, 3.5" double sided/double density, or 3.5" double sided/high density.

6.2.2 Logical Floppy Disk Format

The general logical format of the Network Design Computer Aid floppy disk is depicted in Figure 4. The volume name of the floppy disk will be the network name and the floppy disk number of the network. The volume name will be up to 11 characters: 9 characters for the network name, a dash (-) separator, and a 1 character disk number. (Examples are SAMPLENET-1, CASE3E-5, AFOI-2, etc.) Each floppy will have a single network header file that provides general information about the network and the disk. This information will include the network name, the disk number, the date and time of disk creation, and the type and number of network participants. Preceding the network design loads for each participant type will be a header file that contains specific information about the network design loads for that participant type. The filename for this header file will be of the general form, HEADER.PARTICIPANT TYPE where the three letter character participant type extension could be AOC, F15, CRC, CRP, FAC, etc. For example, the F-15 header file on the floppy would be HEADER.F15. Up to 112 files (header and network design load files) can reside in the volume directory.

6.2.3 Platform Type Header File

The header file will contain repeating information that can vary between like participants in the network. The key to this repeating group is the baseline load filename.

The baseline load file contains the predetermined values for the standard parameters in terminal global memory blocks 1-24 and 60-62. These parameters are independent of the network design process performed by the computer aid. The baseline load file is merged with the time slot and non-time slot parameters from the network design process to produce the network design load for each participant in the network. It is possible that platforms of the same type may have different baseline files. The repeating group in the header will identify the starting and ending platform participant identifier as well as the total number of platforms of the same type that use a specific baseline.

6.2.4 Platform Design Load

Each platform will have a separate network design load file on the floppy disk. The load will consist of 27 blocks of 32 16-bit words. The 16 bits of each word are represented by 4 hexadecimal characters. Each word on a line is separated by a comma. The format will be platform type specific.

Figure 4. NDA Floppy Disk Format

6.2.5 Platform Network Design Load Filenames

The filename for each network design load will be an eight-character participant identifier with a three-character extension for the participant type. The computer aid uses participant identifiers of the type nnn.nnn.nnn where n = any integer from 0 to 9. Typical participants are F15(1.1.1) and CRC (1). The participant identifier is the basis for the name of the associated load file on the network floppy disk. Since DOS filenames are limited to eight characters, the normal participant identifier convention of nine characters can not be used. Therefore, the participant identifiers are treated as nine digit decimal numbers and converted to hexadecimal numbers for the filename. For example, F15(1.1.1) is treated as 001001001.F15 and converted to 000F4629.F15. F15 (1.1.2) is treated as 001001002.F15 and converted to 000F426A. In a similar manner, CRC(1) and CRC(2) are treated as 001000000.CRC and 002000000.CRC and converted to 000F4240.CRC and 001E8480.CRC respectively. Each participant type must check the file extension to find their network design loads on the network floppy disk.

GLOSSARY

ACRONYMS

A0	Availability
ADDS	Army Data Distribution System
AMSL	Above Mean Sea Level
AOC	Air Operations Center
ASCII	American Standard Code for Information Interchange
AT	Acceptance Testing
BIT	Built-In Test
BMSL	Below Mean Sea Level
CDRL	Contract Data Requirements List
CI	Configuration Item
COTS	Commercial-Off-The-Shelf
CRC	Control and Reporting Center
CRP	Control Reporting Post
CRT	Cathode Ray Tube
DBMS	Database Management System
DERG	Data Extraction Reduction Guide
DFAD	Digital Feature Analysis Data
DLRP	Data Link Reference Point
DMA	Defense Mapping Agency
DMA	Direct Memory Access
DNCS	Data Net Control Station
DRC	Dynamics Research Corporation
DRP	Data Reduction Program
DT	Developmental Testing
DX/DR	Data Extraction/Data Reduction
FMS	File Management System
FQT	Formal Qualification Testing
GMSD	Grumman Melbourne Systems Division
GOSIP	Government Open Systems Interface Profile
GUI	Graphics User Interface
HSC	Host Surrogate Configuration
ICD	Interface Control Document

ICP	Interface Change Proposal
ISO	International Standards Organization
JIMC	JTIDS Interface Monitor Configuration
JSC	JTIDS Surrogate Configuration
JTIDS	Joint Tactical Information Distribution System
JTD	JTIDS Test Device
LCN	Logical Channel Number
LRU	Line Replaceable Unit
MTBF	Mean Time Between Failures
MTTR	Meant Time To Repair
NDA	Network Design Aid
NDI	Nondevelopment Item
NPG	Net Participation Group
OS	Operating System
OT	Operational Testing
POSIX	Portable Operating System Interface (UNIX)
PPLI	Precise Position Location Indicator
PROM	Programmable Read-Only Memory
PTU	Participating Test Unit
PUs	Participating Units
ROM	Read-Only Memory
RU	Reporting Unit
SOW	Statement of Work
SRA	Shop Replaceable Assembly
SRU	Shop Replaceable Unit
TADIL	Tactical Digital Information Link
TIDP-TE	Technical Interface Design Plan (Test Edition)
TIM	Terminal Input Message
TOM	Terminal Output Message
TSRD	Test Support Recording Device
VAC	Volts Alternating Current
VDC	Volts Direct Current
WRA	Weapon Replaceable Assembly